

# HP ProLiant ML350 Generation 3 Server

## Setup and Installation Guide



September 2003 (Second Edition)  
Part Number 316354-002

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# Contents

## About This Guide

Audience Assumptions.....	ix
Important Safety Information.....	ix
Symbols on Equipment .....	ix
Rack Stability .....	xi
Symbols in Text.....	xi
Related Documents.....	xii
Getting Help .....	xii
Technical Support.....	xii
HP Website .....	xiii
Authorized Reseller .....	xiii
Reader's Comments .....	xiii

## Chapter 1

### Server Features

Standard Hardware Features.....	1-4
Tower Server Front Panel Components and Drive Bay Dimensions.....	1-4
Rack Server Front Panel Components and Drive Bay Dimensions.....	1-6
Tower Server Rear Panel Components .....	1-7
Rack Server Rear Panel Components .....	1-9
System Board Components.....	1-10
LEDs and Buttons .....	1-12
Processors .....	1-13
System Memory .....	1-13
Expansion Slots.....	1-13
Storage Controller.....	1-13
Network Interface Controller.....	1-14

Ports and Connectors.....	1-14
Power Supply .....	1-14
Video .....	1-14
Warranty .....	1-15
Server Configuration and Management .....	1-16
Security .....	1-17

## **Chapter 2**

### **Overview of Server Installation**

Planning the Server Installation .....	2-2
Rack Planning Resources.....	2-3
Rack Warnings and Cautions.....	2-4
Server Warnings and Cautions.....	2-5
Rack Server Shipping Carton Contents .....	2-6
Tower Server Shipping Carton Contents .....	2-8
Site Environment .....	2-8
Installing the Rack Server.....	2-9
Tower-to-Rack Option .....	2-9
Rack Environment.....	2-10
Locating Materials .....	2-11
Rack Installation Procedures.....	2-12
Installing Rack-Mountable-Specific Server Chassis Components .....	2-12
System Configuration Switch Setting .....	2-13
Installing Component Rails on the Server.....	2-14
Installing the Cable Management Arm Bracket .....	2-16
Securing the Mounting Hardware to the Rack.....	2-17
Marking with the Template .....	2-17
Inserting Cage Nuts into the Rack Frame.....	2-18
Installing the Mounting Bracket Slide Assembly .....	2-19
Installing the Server into Round-Hole Racks .....	2-20
Converting the Mounting Bracket Slide Assembly for Round-Hole Racks.....	2-20
Installing Round-Hole Rack Cage Nuts .....	2-22
Installing the Mounting Bracket Slide Assembly in Round-Hole Racks .....	2-22
Installing the Server into the Rack .....	2-23
Installing the Cable Management Arm .....	2-25
Cabling the Server .....	2-27
Accessing the Redundant Power Supply Bay .....	2-28
Powering Up the Server .....	2-28

Factory-Installed Operating Systems .....	2-30
Operating System Purchased Separately .....	2-32
Configuring the Server .....	2-33
Server Registration .....	2-34

## Chapter 3

### Hardware Options Installation

Preparing the Server .....	3-2
Chassis Components .....	3-2
Powering Down the Server .....	3-3
Removing the Bezel .....	3-4
Removing the Access Panel in a Tower Server .....	3-5
Removing the Access Panel in a Rack Server .....	3-7
Removing the Removable Media Device Blanks .....	3-9
Storage Devices .....	3-10
Identifying Guide Screws .....	3-11
Installation Guidelines for SCSI Hard Drives .....	3-12
Installing and Removing a Hot-Plug Hard Drive .....	3-13
Installing a Device into a Removable Media Bay .....	3-15
Removing a Device from Removable Media Bay .....	3-20
Installing an Expansion Board .....	3-22
Removing the Fan Baffle .....	3-27
Memory Modules .....	3-28
Technical Information and Important Guidelines .....	3-28
Interleaving and Non-Interleaving Memory Configuration .....	3-29
Installing a Memory Module .....	3-30
Removing a Memory Module .....	3-33
Processors and Processor Power Modules .....	3-34
Installing a Processor with Heatsink in the Processor Cage .....	3-34
Installing a Processor Power Module .....	3-41
Removing a Processor .....	3-42
Removing a Processor Power Module .....	3-46
Battery Replacement .....	3-47
Replacing the System Board Battery .....	3-47
Installing the Hot-Plug Redundant Power Supply .....	3-49

## **Chapter 4**

### **Cabling Guidelines**

Storage Device Installation Guidelines.....	4-2
Identifying SCSI Components.....	4-3
Cabling SCSI Devices in the Removable Media Area.....	4-7
Cabling a SmartArray or other RAID Controller.....	4-8
Installing an Internal-to-External SCSI Connector .....	4-10
Connecting ATA or ATAPI Devices to the Integrated IDE Controller .....	4-12
Connecting the System Fans .....	4-13

## **Chapter 5**

### **Server Configuration and Utilities**

ROM-Based Setup Utility.....	5-2
Navigating RBSU.....	5-2
Using RBSU .....	5-3
Redundant ROM Support .....	5-8
Safety and Security Benefits .....	5-8
Access to Redundant ROM Settings .....	5-8
ROMPaq .....	5-9
SmartStart Software.....	5-10
SmartStart Diskette Builder .....	5-10
Insight Manager .....	5-11
Survey Utility.....	5-12
Diagnostics Utility .....	5-12
Automatic Server Recovery .....	5-13
Power-On Self-Test .....	5-13
System Firmware Update.....	5-13

## **Appendix A**

### **Regulatory Compliance Notices**

Regulatory Compliance Identification Numbers .....	A-1
Federal Communications Commission Notice .....	A-2
Class A Equipment .....	A-2
Class B Equipment.....	A-3
Declaration of Conformity for Products Marked with the FCC	
Logo—United States Only .....	A-4
Modifications .....	A-4
Cables .....	A-4

Mouse Compliance Statement .....	A-5
Canadian Notice (Avis Canadian) .....	A-5
Class A Equipment .....	A-5
Class B Equipment.....	A-5
European Union Notice .....	A-6
Japanese Notice .....	A-7
BSMI Notice.....	A-7
Battery Replacement Notice.....	A-8
Laser Compliance.....	A-9
Power Cords .....	A-10

## **Appendix B**

### **Electrostatic Discharge**

Preventing Electrostatic Discharge.....	B-1
Grounding Methods.....	B-2

## **Appendix C**

### **Server Error Messages**

## **Appendix D**

### **Troubleshooting**

When the Server Does Not Start .....	D-3
Diagnosis Steps.....	D-5
Problems After Initial Startup .....	D-10
Other Information Resources .....	D-14

## **Appendix E**

### **LED Indicators, Switches, and Jumpers**

LEDs.....	E-2
System Status LEDs.....	E-3
System Board LEDs.....	E-5
Network Controller LEDs.....	E-8
System Configuration Switch Settings .....	E-9
Non-Maskable Interrupt Switch (NMI) .....	E-11
Resetting System Configuration Settings .....	E-12
Redundant ROM Settings .....	E-13
SCSI Device Jumper Settings.....	E-13

## **Appendix F**

### **Specifications**

Server Specifications .....	F-2
Rack Server .....	F-4
Minimum Hardware Configuration .....	F-5
Supported Operating Systems.....	F-6
Drivers .....	F-6

## **Index**

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## About This Guide

This guide provides IT administrators and technicians setup and installation requirements, precautions, and instructions pertaining to the HP ProLiant ML350 Generation 3 server. The guide explains the standard and optional features of HP ProLiant ML350 Generation 3 servers, how to install hardware options for enhanced system performance, how to install and configure memory, how to install expansion boards, how to install rack and tower models of the servers, and how to cable and configure the servers.

## Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

## ⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

## Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:



**WARNING:** This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

---



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

**WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

---



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

**WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure

---



This symbol on an RJ-45 receptacle indicates a network interface connection.

**WARNING:** To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

---



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.

---



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

**WARNING:** To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

---



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg  
Weight in lb

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

---

## Rack Stability

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**WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
  - The full weight of the rack rests on the leveling jacks.
  - The stabilizing feet are attached to the rack if it is a single-rack installation.
  - The racks are coupled together in multiple-rack installations.
  - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
- 

## Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



**WARNING:** Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

---



**CAUTION:** Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

---

**IMPORTANT:** Text set off in this manner presents essential information to explain a concept or complete a task.

**NOTE:** Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

## Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- *HP ProLiant ML350 Generation 3 Server Maintenance and Service Guide*
- *HP ProLiant ML350 Generation 3 Server Quick Start* poster
- *ROM-Based Setup Utility User Guide*

## Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

## Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website, [www.hp.com](http://www.hp.com).

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

## **HP Website**

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at [www.hp.com](http://www.hp.com).

## **Authorized Reseller**

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

## **Reader's Comments**

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to [ServerDocumentation@hp.com](mailto:ServerDocumentation@hp.com).

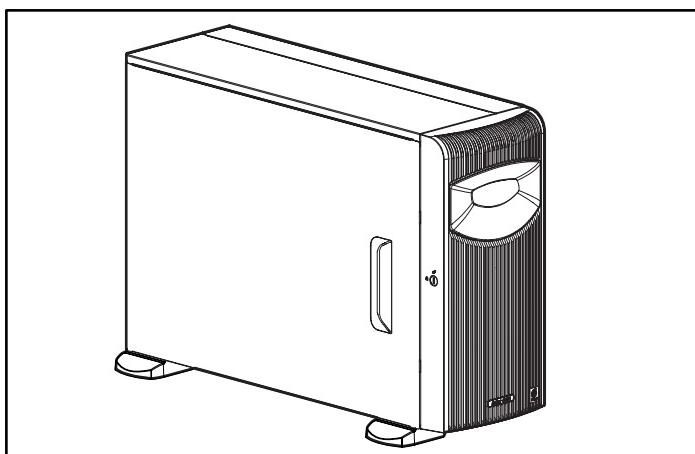
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## Server Features

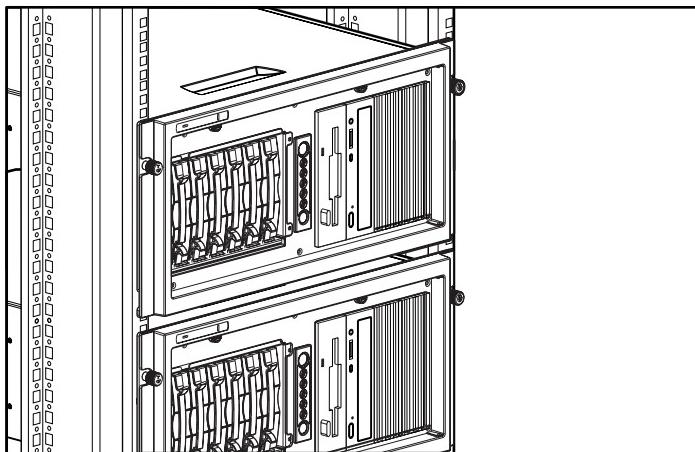
The HP ProLiant ML350 Generation 3 server delivers the latest performance technology and availability features at an affordable price. Whether deployed in a workgroup setting within a large corporation or as the primary server in a small-to-medium business, this server is ideal for applications such as file and print services, shared Internet access, and small databases. The server includes up to two Intel® Xeon processors, PCI-X technology, Gigabit Ethernet and PC2100 DDR memory for blazing performance. Plenty of headroom is also provided with six hot-plug drive bays, two available media slots, and capacity for up to 8 GB of memory. Its simple-to-service 5U design is optimized for both tower and rack environments where it delivers tool-free access to system components, as well as deployment and management tools designed to reduce ownership hassles.

Server features include:

- Intel Xeon processor with Hyper-Threading technology and NetBurst microarchitecture
- Dual Processor capability
- 400/533-MHz front side bus (FSB)
- PC2100 ECC Double Data Rate Synchronous DRAM (DDR SDRAM) DIMMs, upgradeable to 8 GB, with optional interleaving capability
- 500-watt hot-plug power supply, optional 500-watt hot-plug redundant power supply (1+1)
- Capacity for six 1-inch hot-plug hard drives
- Four removable media bays (two available) support optional tape drives, non-hot-plug hard drives or 2-bay SCSI drive cage for two additional hot-plug bays
- Integrated dual channel Ultra3 SCSI
- Integrated NC7760 Gigabit Server NIC Auto Switching Network Controller
- Five PCI slots (four 64-bit 100-MHz PCI-X slots and one 32-bit 33-MHz PCI slot)
- IDE CD-ROM drive
- Diskette drive
- ATI Rage XL video controller with 8 MB RAM
- Tower and rack form factors, tower-to-rack conversion kit
- Insight Manager and SmartStart utilities



**Figure 1-1: ProLiant ML350 Generation 3 tower server**



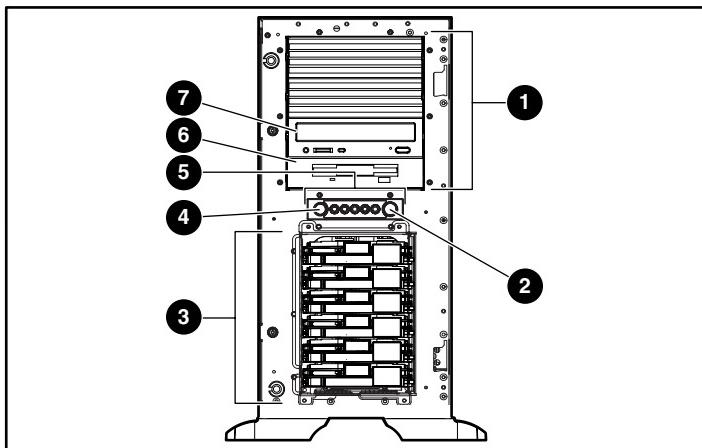
**Figure 1-2: ProLiant ML350 Generation 3 rack server  
(two shown)**

## Standard Hardware Features

The following hardware features are standard on this server, unless otherwise noted.

### Tower Server Front Panel Components and Drive Bay Dimensions

This server supports a maximum of ten internal drives (four are intended for removable media drives and six are for hot-plug hard drives). Figure 1-3 and Table 1-1 show the server front panel components, as well as the drive dimensions.



**Figure 1-3: Identifying front panel components with bezel removed (tower)**

**Table 1-1: Tower Server Front Panel Components with Drive Bay Dimensions**

Item	Component	Dimensions
1	Removable media bays (4)	5.25 in x 1.60 in
2	Power button	N/A
3	Hot-plug hard drive bays	3.5 in x 1.0 in
4	Unit ID button	N/A
5	System status LEDs	N/A
6	Diskette drive	3.5 in x 1.0 in
7	CD-ROM drive	5.25 in x 1.60 in

## Rack Server Front Panel Components and Drive Bay Dimensions

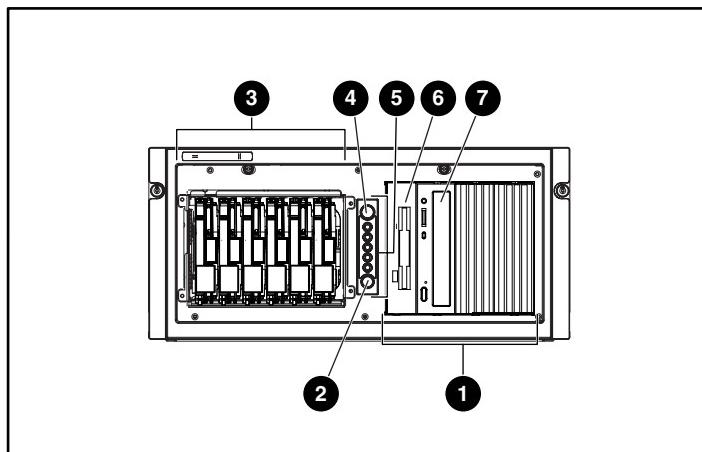


Figure 1-4: Identifying front panel components (rack)

Table 1-2: Rack Server Front Panel Components with Drive Bay Dimensions

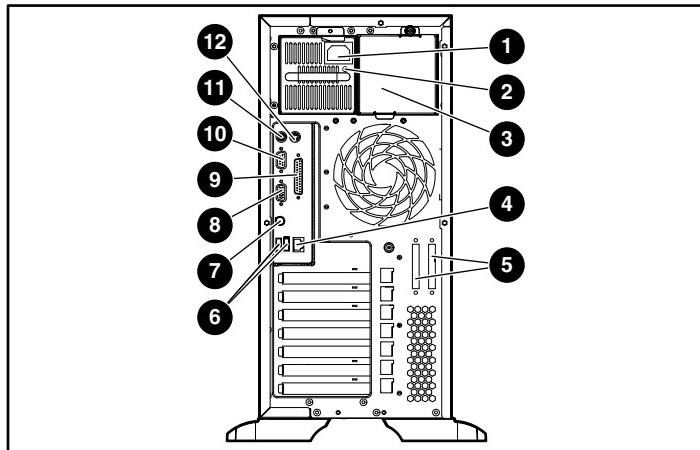
Item	Component	Dimensions
1	Removable media bays (4)	5.25 in x 1.60 in
2	Power button	N/A
3	Hot-plug hard drive bays	3.5 in x 1.0 in
4	Unit ID button	N/A
5	System status LEDs	N/A
6	Diskette drive	3.5 in x 1.0 in
7	CD-ROM drive	5.25 in x 1.60 in

## Tower Server Rear Panel Components



**WARNING:** This equipment is designed for connection to a grounded (earthed) outlet. The grounding-type plug is an important safety feature. To reduce the risk of electric shock or damage to your equipment, do not disable this feature.

Figure 1-5 and Table 1-3 show the connectors on the rear panel of the server.



**Figure 1-5: Identifying rear panel components**

**Table 1-3: Rear Panel Components**

Item	Component	Item	Component
1	Power cord connector	7	Unit ID LED/button
2	Power supply LED	8	Video connector
3	Optional hot-plug redundant power supply bay	9	Parallel port connector
4	RJ-45 Ethernet connector	10	Serial port connector
5	SCSI connector knockouts	11	Keyboard connector
6	USB port connectors (2)	12	Mouse connector

**NOTE:** Refer to Figure E-3 in Appendix E, “LED Indicators, Switches, and Jumpers” for an illustration and explanation of the network controller LEDs which appear on the RJ-45 Ethernet connector.

## Rack Server Rear Panel Components

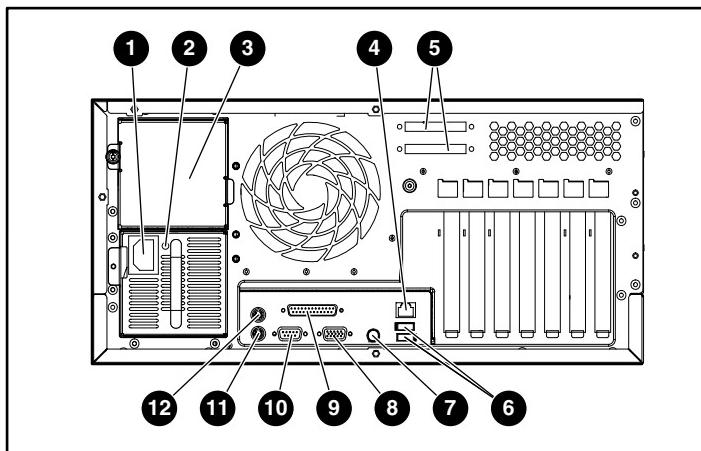


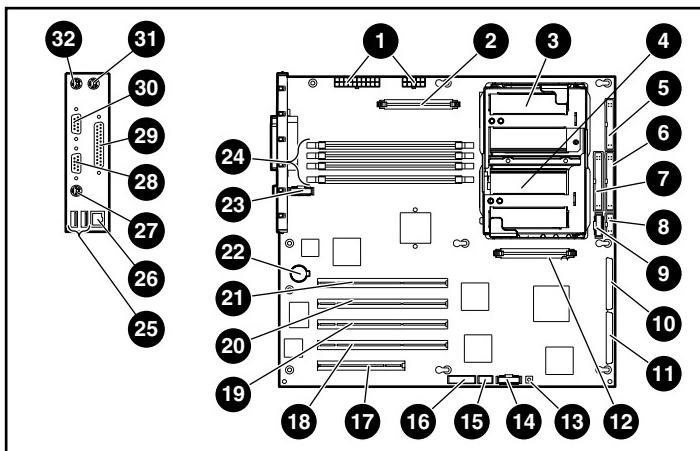
Figure 1-6: Identifying rear panel components (rack)

Table 1-4: Rear Panel Components

Item	Component	Item	Component
1	Power cord connector	7	Unit ID LED/button
2	Power supply LED	8	Video connector
3	Optional hot-plug redundant power supply bay	9	Parallel port connector
4	RJ-45 Ethernet connector	10	Serial port connector
5	SCSI connector knockouts	11	Keyboard connector
6	USB port connectors (2)	12	Mouse connector

## System Board Components

Figure 1-7 and Table 1-5 show the components and connectors on the system board of the server.



**Figure 1-7: Identifying system board components**

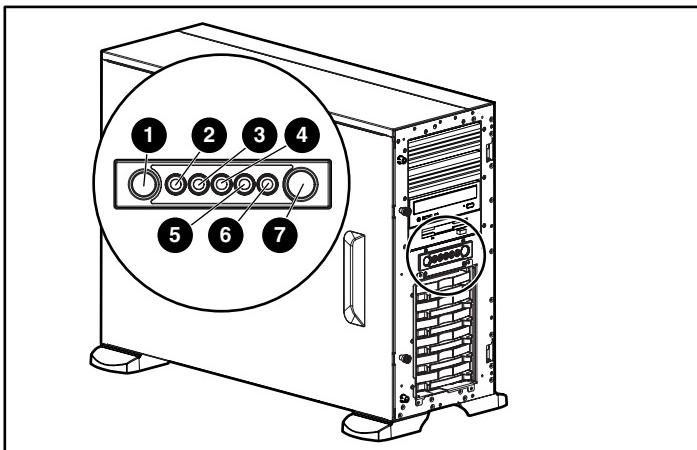
**Table 1-5: System Board Components**

<b>Item</b>	<b>Component</b>	<b>Item</b>	<b>Component</b>
1	Power supply connectors	17	32-bit 33 MHz PCI slot
2	PPM socket 1	18	64-bit 100 MHz PCI-X slot, bus 5
3	Processor socket 1	19	64-bit 100 MHz PCI-X slot, bus 5
4	Processor socket 2	20	64-bit 100 MHz PCI-X slot, bus 2
5	Diskette drive connector	21	64-bit 100 MHz PCI-X slot, bus 2
6	Primary IDE connector (ATAPI devices)	22	Battery
7	Secondary IDE connector (ATAPI devices)	23	CPU fan connector
8	Power button connector	24	DIMM slots
9	I/O fan connector	25	USB port connectors (2)
10	Secondary SCSI connector	26	RJ-45 Ethernet connector
11	Primary SCSI connector	27	Unit ID LED/button
12	PPM socket 2	28	Video connector
13	Non-maskable Interrupt Switch (NMI)	29	Parallel port connector
14	Remote Insight Lights-Out II connector (30-pin)	30	Serial port connector
15	System ID Switch	31	Mouse connector
16	System Configuration Switch	32	Keyboard connector

**NOTE:** For information on system board LEDs, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

## LEDs and Buttons

Figure 1-8 shows the LEDs and buttons on the front panel of the server.



**Figure 1-8: Front panel LEDs and buttons**

**Table 1-6: Front Panel LEDs and Buttons**

Item	LED/Button
1	Unit ID button
2	Unit ID LED
3	Internal Health LED
4	External Health LED
5	NIC activity LED
6	Power LED
7	Power button

## **Processors**

- Intel Xeon processor with Hyper-Threading technology
- Integrated with a minimum of 512-KB level 2 Advanced Transfer Cache
- 400/533-MHz front side system bus
- Dual-processor capability

## **System Memory**

- Advanced Error checking and correcting (AECC) for memory error detection and correction
- PC2100 ECC DDR memory DIMMs, upgradeable to 8 GB
- Support for up to four PC2100 200/266-MHz registered ECC DDR DIMMs
- DIMMs may be installed one at a time or in pairs
- 2 X 1 interleaving memory configuration option (with DIMMs installed in identical pairs) or non-interleaving configuration supported

## **Expansion Slots**

- Five expansion slots: four 64-bit PCI-X 100 MHz slots and one 32-bit PCI 33-MHz slot
- 3.3-volt compatible (5-volt compatible on the 32-bit PCI slot)

## **Storage Controller**

- Integrated dual-channel Ultra3 SCSI adapter on the PCI local bus. The controller provides either two internal SCSI buses, two external SCSI buses, or one internal and one external SCSI bus.
- Optional controller boards for RAID support, controller duplexing or expanding available storage capacity.

## **Network Interface Controller**

- Integrated NC7760 Gigabit Server Autoswitching Network Interface Controller (NIC)
- The Embedded NIC Port 1 PXE Support options allow the server to boot to the network and attach to a PXE server with boot images. When enabled, the NIC port is displayed in the initial program load (IPL) list.

## **Ports and Connectors**

- Serial
- Parallel
- Keyboard
- Mouse
- USB (2)

## **Power Supply**

- CE Mark-compliant 500-watt optionally redundant 1+1 hot-plug power supply with power factor correction and auto switching

## **Video**

- Integrated ATI Rage XL Video Controller providing maximum resolution of 1280 x 1024 noninterlaced at 16.7 million colors
- Supports SVGA, VGA, and EGA graphics resolution
- 8-MB SDRAM video memory

## **Warranty**

Consult the HP Customer Support Center or refer to the Limited Warranty Statement included with the server for details. Certain restrictions and exclusions apply. For additional warranty information, visit the HP website at [www.hp.com/servers/proliant/](http://www.hp.com/servers/proliant/).

The HP Prefailure Warranty helps prevent unplanned shutdowns of the system by allowing for the replacement of covered parts before they fail. The warranty covers processors, memory, and hard drives. Insight Manager, included with the system, must be installed for the HP Prefailure Warranty to be in effect.

When Insight Manager alerts you that a component may be eligible for Pre-Failure Warranty replacement, follow the onscreen instructions or contact an HP authorized service provider in your area. An amber status indicator on the Insight Manager control panel signals that a component is in a prefailure condition and should be replaced.

## **Server Configuration and Management**

This server offers an extensive set of features and optional tools to support effective server management and configuration, including:

- ROM-Based Setup Utility (RBSU) — performs a wide range of system configuration activities
- ROMPaq utility — allows the firmware (BIOS) to be upgraded by flashing the system ROM and provides redundant ROM support in case of ROM corruption
- SmartStart software — provides driver updates and assisted operating system installation
- Insight Manager management tool — monitors fault conditions, server performance, security, and more
- Diagnostics Utility — tests and verifies the operation of HP hardware
- System Firmware Update — enables system administrators to efficiently update system firmware, either directly on remote servers via the network, or locally via Web downloads
- Automatic Server Recovery (ASR) — automatically resets a server that has not responded in a select amount of time or has reached a dangerous temperature
- Survey Utility — allows you to keep a historical record of server hardware and software changes in a single configuration history file
- Power-On Self-Test — checks firmware and assemblies to ensure that the system is properly functioning
- Pre-boot Execution Environment (PXE) — support for installing and configuring operating systems remotely

Refer to Chapter 5, “Server Configuration and Utilities,” for detailed information on each of these utilities.

## Security

Security features include:

- Setup Password
- Power-on Password
- Diskette Drive Control
- Diskette Write Control
- Diskette Boot Override
- Serial Interface Control
- CD Boot Override
- Parallel Interface Control
- Power Switch Protection
- Bezel Lock

Most security features are established through RBSU. For detailed information on RBSU, refer to Chapter 5, “Server Configuration and Utilities,” or refer to the *ROM-Based Setup Utility User Guide*. For additional information concerning server security features, refer to the SmartStart CD included in the shipping box.

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## Overview of Server Installation

The following instructions are provided as an overview for first-time installation of the HP ProLiant ML350 Generation 3 server.



**WARNING: To reduce the risk of electric shock or damage to the equipment:**

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect power from the server by unplugging the power cord from either the electrical outlet or the server.
- Do not place anything on power cords or cables. Arrange them so that no one can accidentally step on or trip over them. Do not pull on a cord or cable. When unplugging from the electrical outlet, grasp the cord by the plug.



**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, “Electrostatic Discharge (ESD),” for more information.

## **Planning the Server Installation**

To ensure maximum performance and availability from the server, plan your operating environment before beginning server installation.

This section discusses site preparation and guidelines for the rack and tower server installation including:

- Rack planning resources
- Rack warnings
- Server warnings and cautions
- Rack server shipping contents
- Tower server shipping contents
- Site environment

## Rack Planning Resources

The following resource information is available for rack designs and products.

The Rack Builder Pro Configuration Tool and Rack Products Documentation is available on the website:

[www.compaq.com/rackbuilder/](http://www.compaq.com/rackbuilder/)

The rack resource kit with Rack Resource CD ships with all Compaq branded racks. A summary of the content of each CD follows:

- Rack Builder Pro Configuration Tool

This information enables you to simulate potential Compaq branded rack configurations based on your input. Rack Builder Pro provides the following information:

- Graphical preview of properly configured racks
- Site planning data, including power requirements, cooling mandates, and physical specifications
- Ordering information, including required components, part numbers, and appropriate quantities

- Installing Rack Products video

This video provides a visual overview of operations required for configuring a Compaq branded rack with rack-mountable components. It also provides the following important configuration steps:

- Planning the site
- Installing rack servers and rack options
- Cabling servers in a rack
- Coupling multiple racks

- Rack Products Documentation CD

The resource information on this CD enables you to view, search, and print documentation for Compaq branded racks and rack options. It also helps you set up and optimize your new Compaq branded rack in a manner that best fits your environment.

## Rack Warnings and Cautions

Before installing your rack, carefully review the following warnings and cautions:



**WARNING:** To reduce the risk of personal injury or equipment damage, always be sure that the rack is adequately stabilized before extending a component outside the rack. A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.



**WARNING:** To reduce the risk of personal injury or equipment damage, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizers are attached to the rack for single-rack installation.
- The racks are installed together in multiple-rack installations.



**WARNING:** To reduce the risk of personal injury or equipment damage, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and may become unstable when being moved on its casters.

Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.



**CAUTION:** Always begin by mounting the heaviest item on the bottom of the rack. Continue to populate the rack from the bottom to the top.

## Server Warnings and Cautions

Before installing the server, carefully review the following warnings and cautions:



**WARNING:** This server weighs 27.24 kg (60 lb) with no drives installed. To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails.
- Use caution when installing the product in or removing the product from the rack; the product is unstable when not fastened to the rails.



**WARNING:** When the server weighs more than 22.7 kg (50.4 lb), at least two people must lift the server into the rack together. If the unit is loaded into the rack above chest level, a third person must assist in aligning the rails while the other two support the unit.



**WARNING:** To reduce the risk of personal injury from hot surfaces, enable the drives and the internal system components to cool before touching them.



**WARNING:** To reduce the risk of electrical shock or damage to the equipment, only enter or service specific parts of the server as instructed in the user documentation.



**WARNING:** Setting the server Power On/Standy button to the off position removes power from most areas of the server. This process may take 30 seconds. Portions of the power supply and some internal circuitry remain active until the AC power cord is disconnected.

To remove power completely, disconnect the power cord. If the server has multiple power supplies installed, unplug all power cords to completely remove power from the system.



**WARNING:** When performing non-hot-plug operations, you must power down the system. However, it may be necessary to leave the server powered up when performing other operations, such as hot-plug installations or troubleshooting.



**CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating UPS device. This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

---



**CAUTION:** Do not operate the server for long periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

---

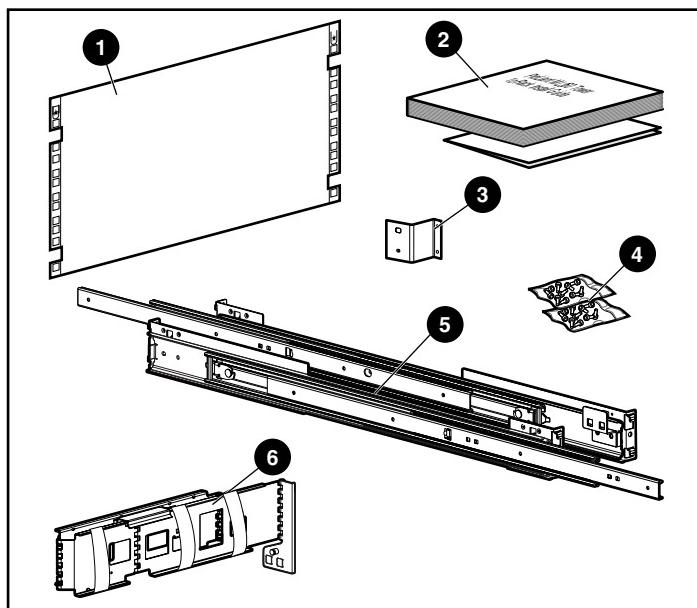
## Rack Server Shipping Carton Contents

Unpack the server box, hardware, and documentation according to the instructions and illustrations printed on the shipping carton. All of the rack-mounting hardware necessary for installation of the rack server into a Compaq branded rack is included with the server.

The contents of the rack server box provided with the server include the following:

- HP ProLiant ML350 Generation 3 server
- Power cord
- Hardware documentation, reference information, and software products
- Rack-mounting hardware

Before beginning rack installation, be sure that you have all of the components shown in the following illustration.



**Figure 2-1: Rack-mounting hardware**

**Table 2-1: Rack Mounting Hardware**

Item	Description	Item	Description
1	Rack template	4	Torx screws
2	Documentation	5	Mounting bracket slide assemblies and component rails
3	Cable management arm bracket	6	Cable management arm

## Tower Server Shipping Carton Contents

Unpack the server, keyboard, and cables according to the instructions and illustrations printed on the shipping carton.

The contents of the tower server carton include:

- HP ProLiant ML350 Generation 3 server
- Power cord
- Keyboard
- Mouse
- Hardware documentation, reference information, and software products

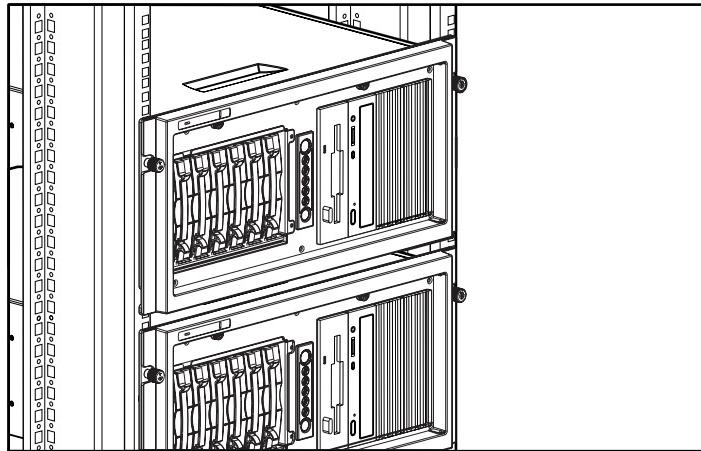
## Site Environment

Refer to the “Rack Environment” section later in this chapter and to Appendix F, “Specifications,” for detailed power and environmental site requirements.

## Installing the Rack Server

The rack model comes ready for immediate installation. This section provides environmental information required for the installation of a rack-mounted server.

Figure 2-2 shows the server installed in a rack configuration.



**Figure 2-2: HP ProLiant ML350 Generation 3 servers installed in a rack**

## Tower-to-Rack Option

A rack conversion option kit is available for customers who want to convert a tower server to a rack server.

To purchase the rack conversion kit (Part Number 290683-B21), contact your local HP authorized reseller or order direct from HP.

A selection of racks for the server can be purchased through your HP authorized reseller or direct from HP at [www.hp.com/servers/proliant/](http://www.hp.com/servers/proliant/).

## Rack Environment

To allow for servicing and adequate airflow, observe the following spatial and environmental requirements when selecting a site for your rack-mounted server:

- Select a sturdy, level installation site that includes dedicated and properly grounded (earthed) circuits, air conditioning and electrostatic discharge (ESD) protection.
- Leave a minimum clearance of 63.5 cm (25.0 inches) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30.0 inches) behind the rack.
- Leave a minimum clearance of 121.9 cm (48.0 inches) from the back of the rack to the back of another rack or row of racks.

HP servers draw in cool air through the front door of the rack and expel warm air through the rear door. Therefore, the front door must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

**IMPORTANT:** Do not block the ventilation openings.

When there is any vertical space in the rack not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.



**CAUTION:** Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

Compaq branded 9000 and 10000 Series racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation. Refer to the rack documentation provided with Compaq branded 7000 Series racks for guidelines on meeting airflow requirements.



**CAUTION:** When using a Compaq branded 7000 Series rack, you must install the high-airflow rack door insert [Part Number 327281-B21 (42U) and Part Number 157847-B21 (22U)] to provide proper front-to-back airflow and cooling to prevent damage to the equipment.



**CAUTION:** If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors: If the 42U server rack includes closing front and rear doors, ensure 5,350 sq cm (830 square inches) of holes are evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
  - Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches).
- 

## Locating Materials

Locate the following materials that were shipped with the server:

- Keyboard (not included with the rack model)
- Mouse (not included with the rack model)
- Power cord
- Documentation and software packs inside the shipping box
- Rack-mounting hardware (rack model only)

In addition to the supplied items, you may need:

- Torx T-15 screwdriver
- Hardware options
- Ethernet cable
- Operating system or application software
- Uninterruptible Power Supply (UPS) or Power Distribution Unit (PDU)
- Monitor

## Rack Installation Procedures

Install any optional hardware components before installing and powering up the server for the first time. Refer to Chapter 3, “Hardware Options Installation,” for instructions on installing PCI expansion boards, memory, processors, hot-plug expansion boards, and other major hardware options.

The rack installation sequence for this server includes:

- Installing rack-mountable-specific server chassis components
- Securing the mounting hardware to the rack
- Installing the server into the rack
- Installing the cable management arm
- Cabling the server
- Powering up the server
- Installing an operating system
- Configuring the server
- Registering the server

## Installing Rack-Mountable-Specific Server Chassis Components

You must configure the server per the following before installing in the rack:

- System Configuration Switch setting (factory pre-set for rack model servers)
- Component rails
- Cable management arm bracket

## System Configuration Switch Setting

Switch 3 on the system configuration switch is the rack configuration switch. This will be pre-set at the factory to the **on** position for rack model servers and does not require any action at the install site. Figure 2-3 shows the system configuration switch setting with the factory pre-set positions.

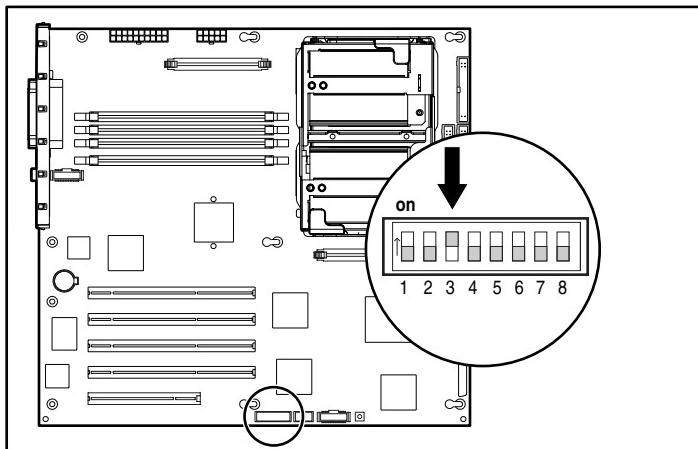


Figure 2-3: System configuration switch setting

## Installing Component Rails on the Server

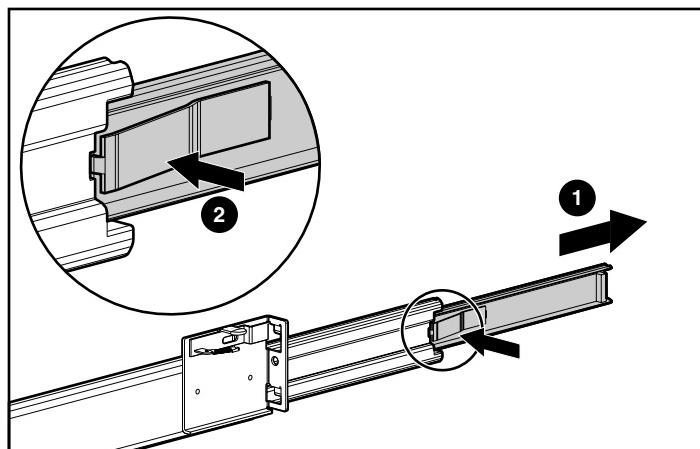
Your conversion kit includes a set of adjustable-length slide rail assemblies. A slide rail assembly consists of:

- A component rail that is mounted to the server
- A slide rail, which is the mechanism that accepts the component rail and is mounted to the rail mounting bracket

The component rails are installed into the slide when shipped and must be removed before the component rails can be mounted to the server.

To remove the component rail from the slide:

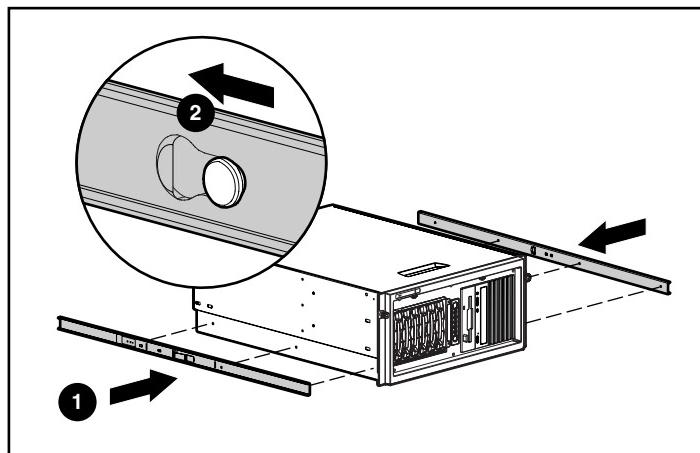
1. Extend the component rail from the slide until the component rail release latch clicks (1).
2. Holding down the latch (2), pull the component rail out of the slide. You may need to give the rail a sharp tug to disengage it from the slide.



**Figure 2-4: Removing the component rail from the slide**

To install the component rails onto the server:

1. Line up the mounting holes in the component rail with the chassis mounting spools on the server (1).
2. Place the component rail on the server and slide it towards the back of the chassis until the mounting spool locks engage (2).
3. Repeat this procedure on the other side of the server using the second component rail.



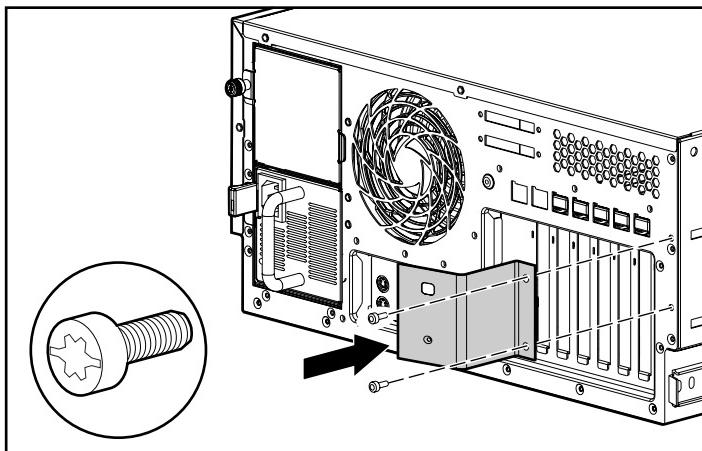
**Figure 2-5: Installing a component rail onto the server**

## Installing the Cable Management Arm Bracket

The cable management arm bracket allows you to secure the cable management arm to the server and to the rear frame of the rack.

To install the cable management arm bracket to the server:

1. Locate the two bracket screws included with your kit.
2. Using a Torx T-15 screwdriver and the two bracket screws, secure the cable management arm bracket to the back of the server.



**Figure 2-6: Securing the cable management arm bracket to the server**

## Securing the Mounting Hardware to the Rack

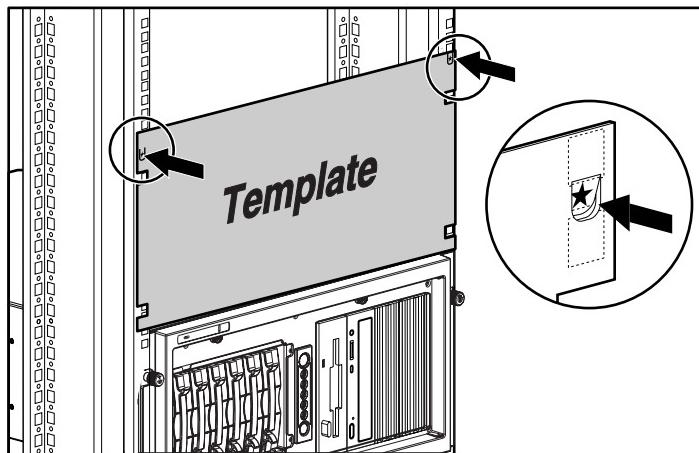
To secure the mounting brackets and slide rail assemblies:

- Mark the server rack position with the template.
- Insert cage nuts into the rack frame.
- Install the mounting bracket slide assembly onto the rack.

### Marking with the Template

A template is provided to mark the rack for cage nut and mounting bracket positions. Starting at the bottom of the rack or at the top of a previously mounted component:

1. With the two push tabs, place the template in the desired location. Make sure that you match the hole pattern printed on the template with the actual holes on the rack vertical rails.



**Figure 2-7: Using the template**

2. Use a pencil to mark locations indicated on the template for cage nuts and slide assembly mounting brackets.

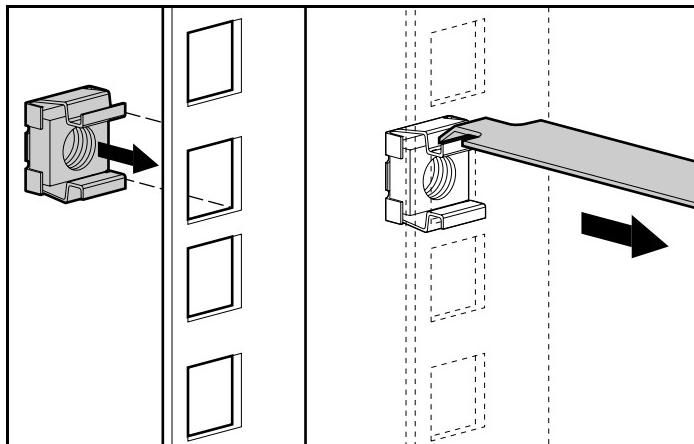
3. After marking the front of the rack, flip the template over, then repeat the procedure on the back rails of the rack. Also mark the top of the template on the rack to help align the next components.

## Inserting Cage Nuts into the Rack Frame

Use the fitting tool to insert cage nuts on the **inside** of the rails at the marked locations. Make sure to install two cage nuts at the front of the rack. These will be used to secure the server chassis to the rack using the two front panel thumbscrews (refer to Figure 2-15).

**NOTE:** The cage nuts and fitting tool are included in the hardware kit supplied with the rack.

1. On the inside of the rail, hook one of the lips of the cage nut through the square rail hole.
2. Insert the tip of the fitting tool through the other side of the hole, then hook the opposite lip of the cage nut.



**Figure 2-8: Inserting cage nuts into the rack frame**

3. Using the fitting tool as a lever, slide the cage nut lip into position.
4. Repeat this procedure for each cage nut.

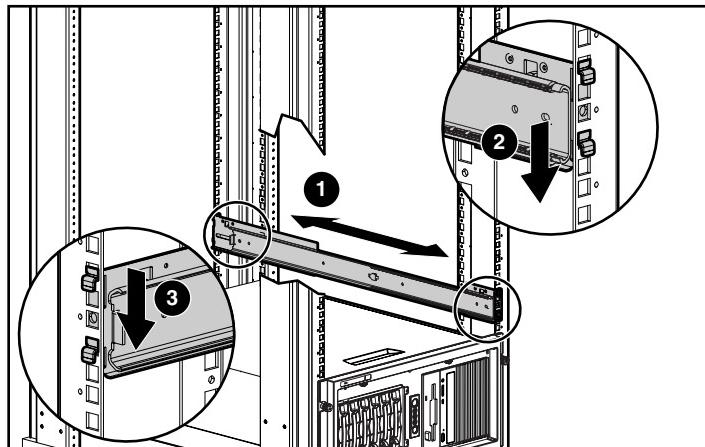
## Installing the Mounting Bracket Slide Assembly

The mounting bracket slide assemblies are labeled with the correct positioning in the rack. The labels will read “Front-Left,” “Back-Left,” “Front-Right,” and “Back-Right.”

To install the mounting bracket slide assembly:

1. Select the appropriate slide assembly, matching the position label on the slide with the side being installed. The slide assembly as shown in Figure 2-9 would be labeled “Front – Right” on the inside front surface.
2. Position the mounting bracket according to the pencil marks made with the template earlier, extending the slide assembly to fit the rack (1).
3. Secure the front of the mounting bracket first, inserting the mounting tabs into position and pushing down until the locking latch engages (2).
4. Secure the back of the mounting bracket (would be marked “Back – Right” in Figure 2-9 example) by inserting the mounting tabs into the rack and pushing down until the locking latch engages (3).

**NOTE:** Be sure that the mounting bracket is level from front to back.



**Figure 2-9: Securing the mounting bracket slide assembly to the rack**

5. Repeat this process for the other mounting bracket slide assembly.

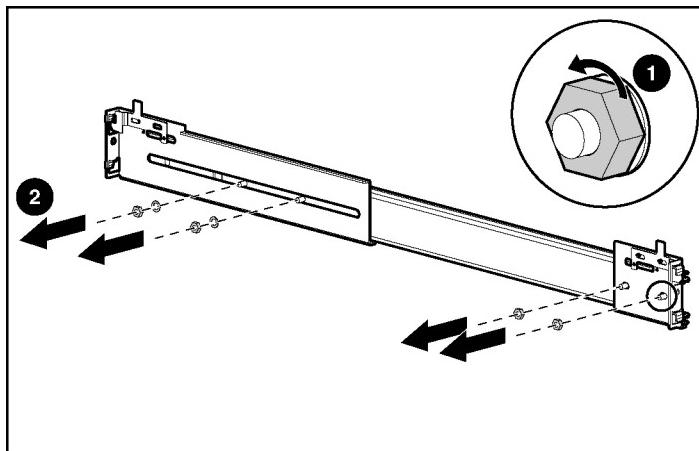
## Installing the Server into Round-Hole Racks

This server can be installed in round-hole racks. The following sections provide details for converting the mounting bracket slide assembly to the round-hole configuration and installing into round-hole racks.

### Converting the Mounting Bracket Slide Assembly for Round-Hole Racks

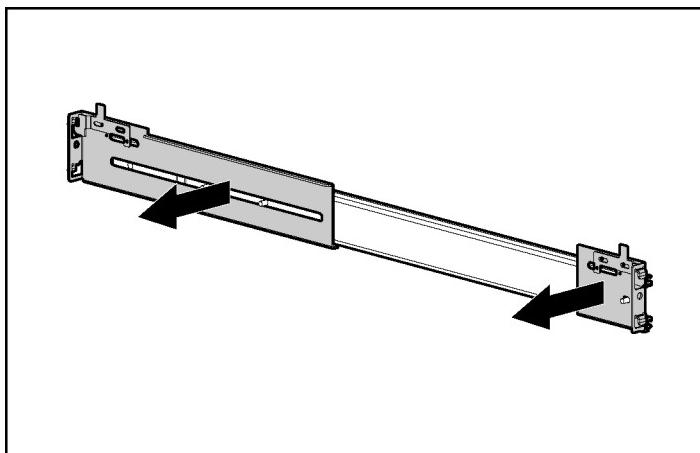
To convert the slide assembly for round-hole racks:

1. Loosen the nuts and washers (1) and remove them from the original rail brackets (2).



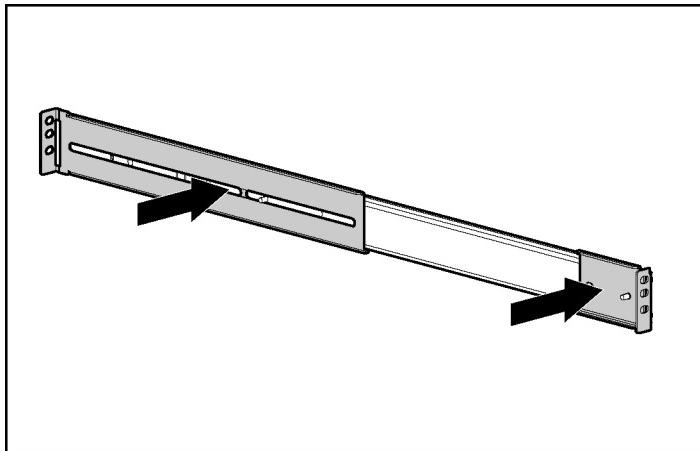
**Figure 2-10: Removing the nuts and washers**

2. Remove the original rail brackets from the slide assembly.



**Figure 2-11: Removing the brackets from the slide assembly**

3. Install the round-hole conversion brackets on the slide rail assembly.



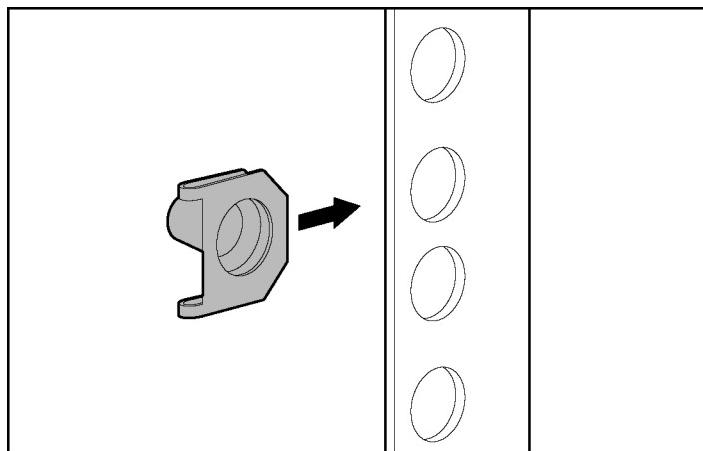
**Figure 2-12: Installing the round-hole conversion brackets**

4. Reinstall the hardware removed in step 1.

## Installing Round-Hole Rack Cage Nuts

The round-hole rack cage nuts can be installed without special tools. Make sure to install two cage nuts at the front of the rack at the locations marked in the section “Marking with the Template.”

**NOTE:** The cage nuts are included in the hardware kit supplied with the rack.



**Figure 2-13: Installing round-hole rack cage nuts**

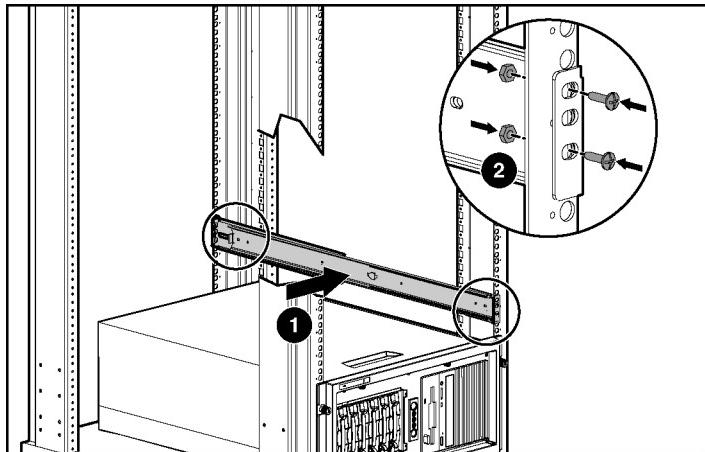
## Installing the Mounting Bracket Slide Assembly in Round-Hole Racks

The mounting bracket slide assemblies are labeled with the correct positioning in the rack. The labels will read “Front – Left,” “Back – Left,” “Front – Right,” and “Back – Right.”

To install the mounting bracket slide assembly:

1. Select the appropriate slide assembly, matching the position label on the slide with the side being installed.

2. Position the slide assembly according to the pencil marks made with the template earlier, extending the slide assembly to fit the rack (1).
3. Secure the front of the mounting bracket first. Insert the round-hole rack bracket mounting screws and nuts into position and tighten (2).



**Figure 2-14: Securing the round-hole rack bracket slide assembly**

4. Secure the back of the slide assembly. Insert the round-hole rack bracket mounting screws and nuts into position and tighten.

---

**IMPORTANT:** Be sure that the mounting bracket is level from front to back.

---

Repeat this process for the other mounting bracket slide assembly.

## Installing the Server into the Rack

To install the server into the rack:



**WARNING:** To reduce the risk of personal injury or damage to the equipment, a minimum of two people **MUST** lift the server into the rack. If the unit is loaded above chest level, a third person must assist in aligning the rails while the other two support the unit.

---

**NOTE:** The server can be installed with the mounting bracket slide assembly in either closed or extended position.

1. Carefully align the server component rails with the rack slide rails, then slide the server all the way into the rack (2) until the server rail locks engage (1).



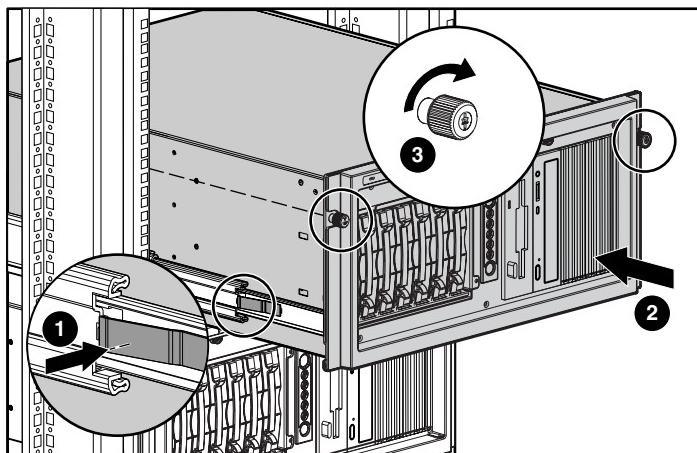
**CAUTION:** Be sure to keep the server parallel to the floor when sliding the server component rails into the mounting bracket slide rails. Tilting the server up or down can result in damage to the rails.



**WARNING:** To reduce the risk of personal injury, be careful when sliding the server into the rack. The slide rails could pinch your fingertips.

**IMPORTANT:** The first time you slide the server into the rack, you may have to apply some pressure. After the first time, the ball bearings in the slide should move easily.

2. Slide the server in and out of the rack several times to properly align the slide mount rails.
3. Secure the server by screwing the front panel thumbscrews into the rack (3).



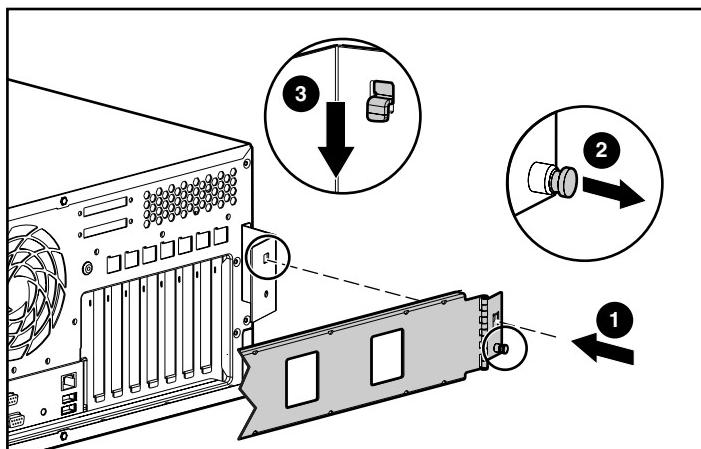
**Figure 2-15: Loading the server into the rack**

## Installing the Cable Management Arm

The cable management arm secures to the cable management arm bracket that was previously installed. See “Installing the Cable Management Arm Bracket” section earlier in this chapter. All cables running to and from the server are secured to this arm. The cable management arm allows the cables to swing out of the way when the server is accessed.

To install the cable management arm:

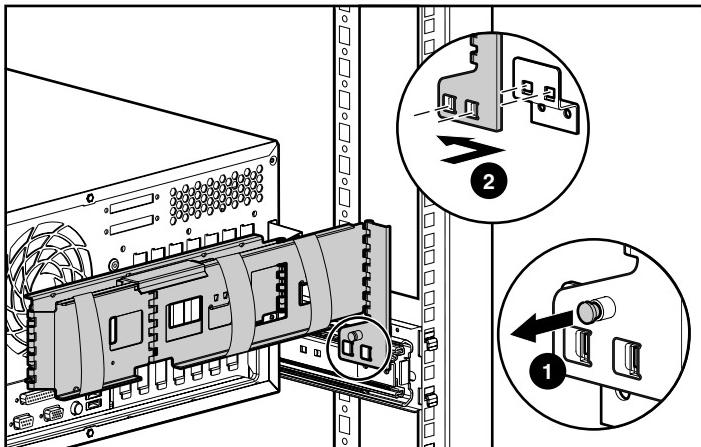
1. Slide the server into the rack. See “Installing the Server into the Rack” earlier in this chapter.
2. Secure the server end of the cable management arm (1) to the cable management arm bracket (located on the server) by pulling out on the spring-loaded fastener (2), inserting the locking tab (3) into the cable management arm bracket, releasing the spring-loaded fastener, and pushing down until the spring-loaded fastener engages.



**Figure 2-16: Securing the cable management arm to the bracket**

3. Align the other end of the cable management arm with the **inside** of the left rear rack frame mounting bracket (mounted on rear of left side slide assembly).

4. Secure the cable management arm to the rear rack frame mounting bracket by pulling out on the spring-loaded fastener (1), inserting the two locking tabs (2), releasing the spring-loaded fastener, and pressing in towards the server chassis until the spring-loaded fastener engages.

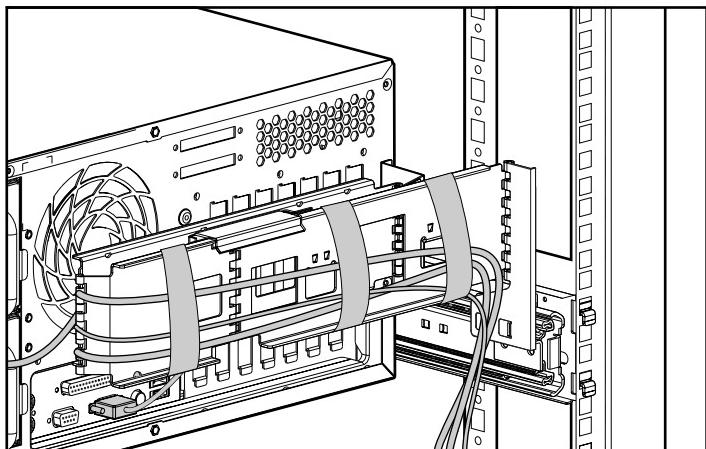


**Figure 2-17: Securing the cable management arm to the mounting bracket**

## Cabling the Server

After the cable management arm is installed, cable the server by following these procedures:

1. Plug all external cables into the server.
2. If you installed a switchbox into the rack, route the CPU-to-switchbox cables to the switchbox.
3. Bundle all of the cables, including the power cable, then secure them to the cable management arm using the Velcro strips.



**Figure 2-18: Routing and securing the cables**

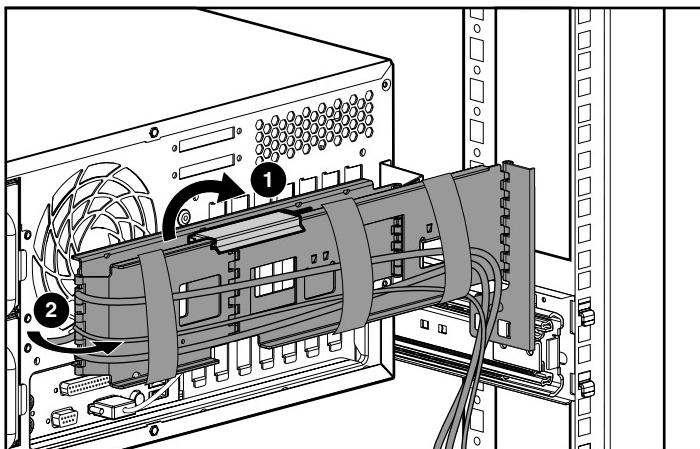
4. Extend the bundled cables down the rack cable channel.

## Accessing the Redundant Power Supply Bay

The cable management arm comes with a center joint to allow easy access to the power supply bays without having to remove the arm.

To service the power supply bays:

1. Lift up the center joint locking bracket located near the center of the outside cable management arm piece (1).
2. Swing the cable management arm back away from the server chassis (2).



**Figure 2-19: Swinging the Cable Management Arm away from the chassis**

3. After completing the desired service function, return the cable management arm to its locked position by reversing steps 1 and 2.

## Powering Up the Server

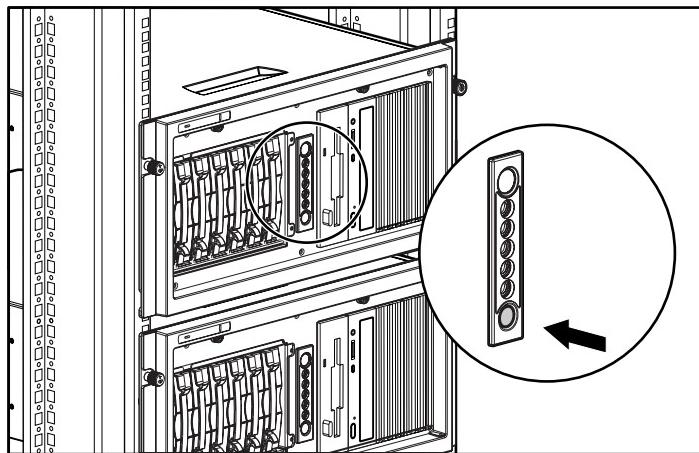
Power up the server after the peripheral and power cords are connected to the server.

**WARNING: To reduce the risk of electrical shock or damage to the equipment:**

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from each power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord exits from the server.

To power up the server:

1. Press the Power On/Standy button to power up the server.



**Figure 2-20: Powering up the rack server**

2. Observe the front panel LEDs to verify a successful power-on sequence. For a detailed explanation of all system LEDs, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

When the server powers on for the first time, the server performs a POST and launches RBSU. After selecting initial system settings, install your operating system and perform additional configuration tasks. For additional information about configuring the server with RBSU, refer to the *ROM-Based Setup Utility User Guide* and to Chapter 5, “Server Configuration and Utilities.”

## Factory-Installed Operating Systems

If you ordered the server with a preinstalled operating system, everything required to install your operating system is already on the server. Refer to the steps provided in the *Factory-Installed Operating System Software User Guide* for more information on using your operating system.

1. Review and follow the guidelines and procedures in the previous sections of this chapter.
2. Connect the cables: keyboard, mouse, monitor, network, and power. Refer to the section for tower server or rack server rear panel components in Chapter 1, “Server Features.”



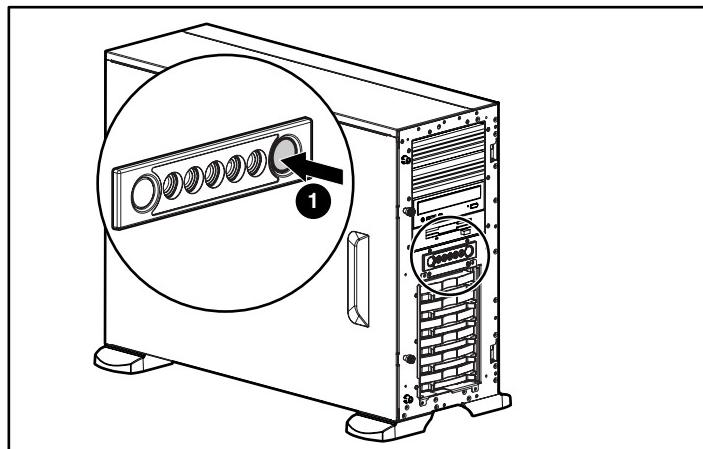
**WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.**

---

3. Locate the key and unlock the front bezel if necessary.

**NOTE:** A key hook is located inside the front bezel above the keylock latch. For your convenience, you may use the key hook to store the key when it is not needed.

4. Power up the server by opening the front bezel and pressing the Power On/Standby button on the front of the server (1).



**Figure 2-21: Powering up the server (bezel removed for clarity)**

5. Follow the onscreen instructions to complete the preinstalled operating system initialization process. After initialization is complete, the server automatically goes through Power-On Self-Test (POST).
6. To manage the server, install Insight Manager, found on the Management CD. For Management CD initialization procedures, refer to the Server Setup and Management pack shipped with the server.

**IMPORTANT:** You must install and use Insight Manager to benefit from the Pre-Failure Warranties on processors, hard drives, and memory modules.

7. After verifying your specific server configuration, back up the system configuration. Refer to the SmartStart CD for further information on backing up your system configuration.
8. Install any additional hardware. Refer to Chapter 3, “Hardware Options Installation,” or the option kits, for detailed instructions on installing internal hardware.
9. Install any application software.

10. Register the server. Refer to the “Server Registration” section later in this chapter for details.

The installation is complete.

## **Operating System Purchased Separately**

If you purchased your operating system separately, install it using the SmartStart CD. Refer to the Server Setup and Management pack for instructions on using the SmartStart software. The first time the server is configured, the SmartStart program automatically creates a necessary partition on your hard drive. This partition cannot be used for any other purpose and is not a traditional system partition.

Follow this sequence when installing your operating system for the first time:

1. Review and follow the guidelines and procedures in the previous sections of this chapter.
2. Install any hardware options if needed. Refer to Chapter 3, “Hardware Options Installation,” or the options kits for detailed installation instructions.



**WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.**

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3. Connect cables: keyboard, mouse, monitor, network, and power. Refer to the rear panel components section applicable to your tower or rack server in Chapter 1 of this guide.
4. Locate the key and unlock the front bezel if necessary.

**NOTE:** A key hook is located inside the front bezel above the keylock latch. For your convenience, you may use the key hook to store the key when it is not needed.

5. Power up the server by pressing the Power On/Standy button on the front of the server.
6. Configure the server. Refer to “Configuring the Server” later in this chapter for instructions.

7. Install the operating system.
  8. Install Insight Manager to manage the server. For Management CD initialization procedures, refer to the Server Setup and Management pack shipped with the server.
- IMPORTANT:** You must install and use Insight Manager to benefit from the Pre-Failure Warranties on processors, hard drives, and memory modules.
9. Install any application software needed.
  10. Register the server. Refer to “Server Registration” later in this chapter for details.

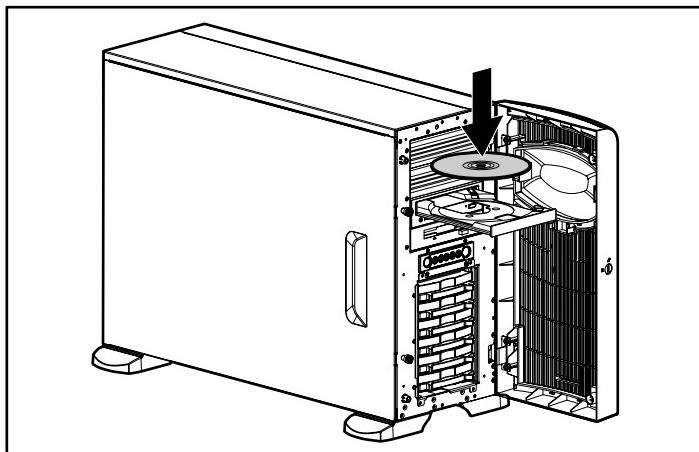
## Configuring the Server

The server setup utility, RBSU, can be used to configure the server and options. To initiate RBSU, press the **F9** key when prompted during start up.

The SmartStart CD contains ROMPaq and updated drivers, and assists with operating system installation. To use the SmartStart CD:

1. Locate the SmartStart CD in the Server Setup and Management pack.
2. Power up the server and press the CD-ROM drive eject button.

3. Insert the SmartStart CD into the CD-ROM drive with the labeled side up. Handle the CD by its edges, not by the flat surfaces of the disc.



**Figure 2-22: Inserting a CD into the CD-ROM drive**

4. The SmartStart utility sequence begins when the busy indicator on the CD-ROM turns green. Refer to the SmartStart CD for more information.

## Server Registration

For server registration information, refer to the Server Setup and Management pack shipped with the server, or visit the website [www.register.hp.com](http://www.register.hp.com).

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## Hardware Options Installation

This chapter provides procedures for installing, removing, and replacing hardware options in the HP ProLiant ML350 Generation 3 server.



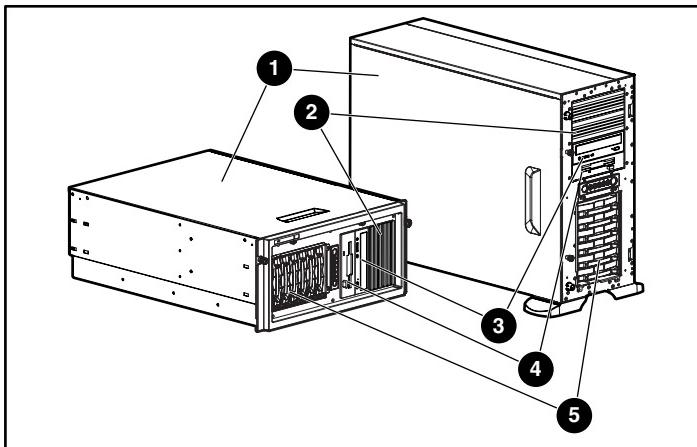
**CAUTION:** Electrostatic discharge (ESD) can damage electronic components of the server. Before beginning any installation procedure, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

---

## Preparing the Server

Before installing or removing any options, prepare the server by performing the following procedures. Refer to Figure 3-1 and Table 3-1 to review chassis components.

### Chassis Components



**Figure 3-1: Identifying rack and tower chassis components**

**Table 3-1: Rack and Tower Chassis Components**

Item	Description
1	Access panel
2	Removable media bays
3	CD-ROM drive
4	Diskette drive
5	Hard drive bays

## **Powering Down the Server**

To power down the server:



**CAUTION:** Failure to follow these directions could result in damage to equipment or loss of information.

---

1. Back up the server data and record configuration information.
  2. Shut down the operating system as directed in your operating system instructions.
  3. Power down the server by pressing the power button on the front of the server.
  4. Remove the power cord.
- 
- 
- A triangular warning icon with an exclamation mark inside.
- WARNING:** To reduce the risk of injury from electric shock or damage to the equipment when installing an upgrade, be sure that the server is powered down. Remove all AC power cords to completely disconnect power from the system. The front panel power button may not completely shut down power to the server.
- 
5. Disconnect any external equipment connections from the server.

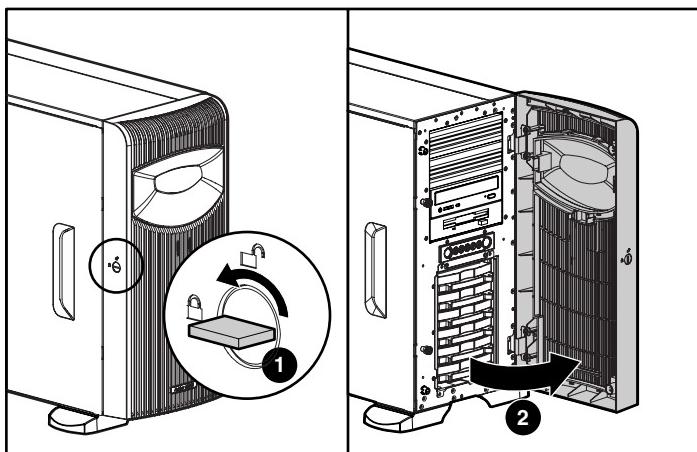
## Removing the Bezel

To remove the bezel:



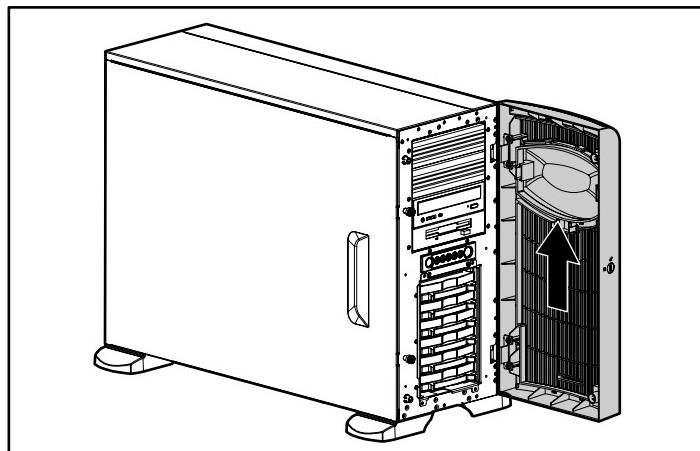
**CAUTION:** To prevent damage to equipment or loss of data, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the bezel.

1. Follow the steps in “Powering Down the Server” earlier in this chapter.
2. If necessary, unlock the bezel using the included key (1).
3. Open the bezel fully to the right (2).



**Figure 3-2: Unlocking and opening the bezel**

4. To remove the bezel, lift the bezel upward, and pull it away from the chassis.



**Figure 3-3: Removing the bezel**

5. To replace the bezel, reverse the above procedure.

**NOTE:** When replacing the bezel, be sure that the bottom hinge points are properly placed in the chassis before rotating the bezel back into its original position.

## Removing the Access Panel in a Tower Server



**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.



**CAUTION:** To prevent damage to equipment or loss of data, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

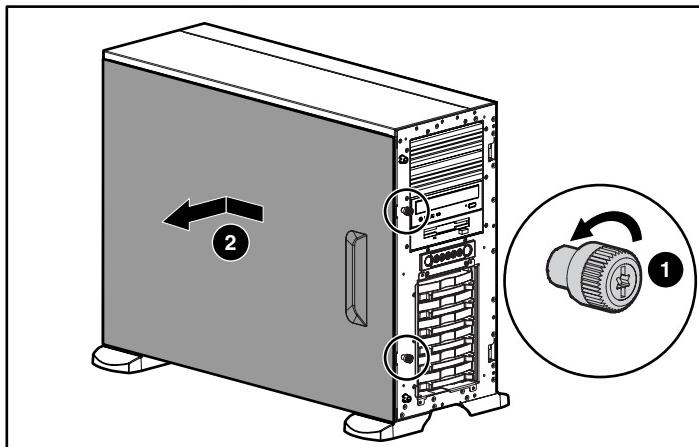


**CAUTION:** Do not operate the server when the large access panel is removed. This panel is an integral part of the cooling system and removing it while the system is running may adversely affect data integrity.

To remove the access panel:

1. Loosen the two thumbscrews located on the left side of the front chassis (1).
2. Slide the access panel back about 1.5 cm (0.5 inches) (2).
3. Lift and remove the panel.

**NOTE:** Turn the access panel over to locate the System Configuration hood label. This label provides information on installing processor board options, configuring drives, installing drives, LED status indicators, and setting switches.



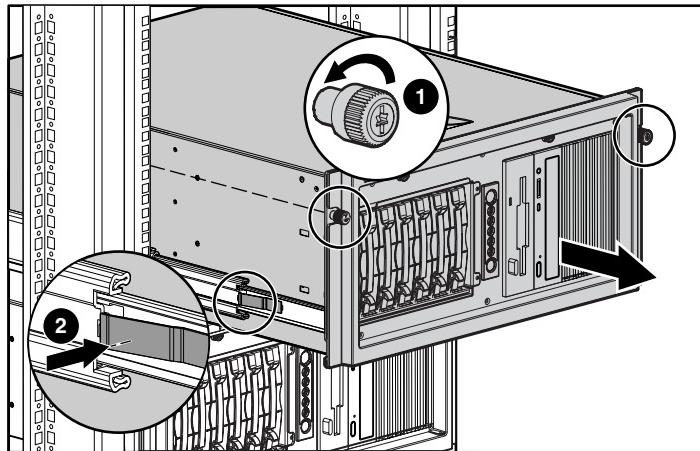
**Figure 3-4: Loosening the thumbscrews and removing the access panel**

4. To replace the access panel, reverse steps 1 through 3.

## Removing the Access Panel in a Rack Server

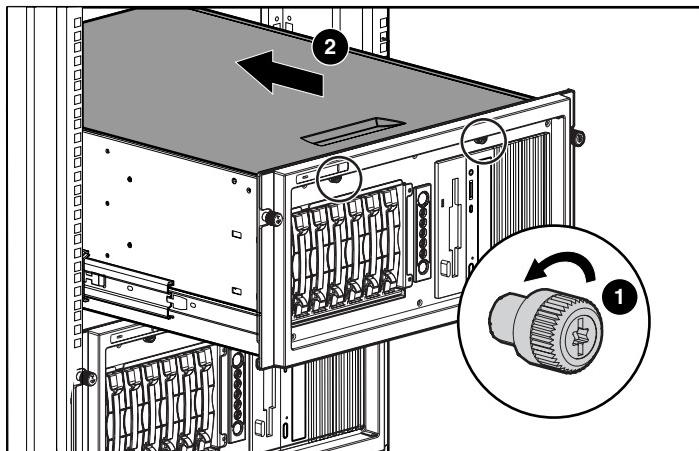
To extend the server from the rack and remove the access panel:

1. Loosen the two thumbscrews that secure the chassis to the front of the rack (1).
2. Slide the server out of the rack until the sliding rails lock (2).



**Figure 3-5: Sliding the server out of the rack**

3. Loosen the two thumbscrews located at the top of the front chassis (1).
4. Slide the access panel back about 1.5 cm (0.5 inches) (2).
5. Lift and remove the panel.



**Figure 3-6: Removing the access panel**

## Removing the Removable Media Device Blanks

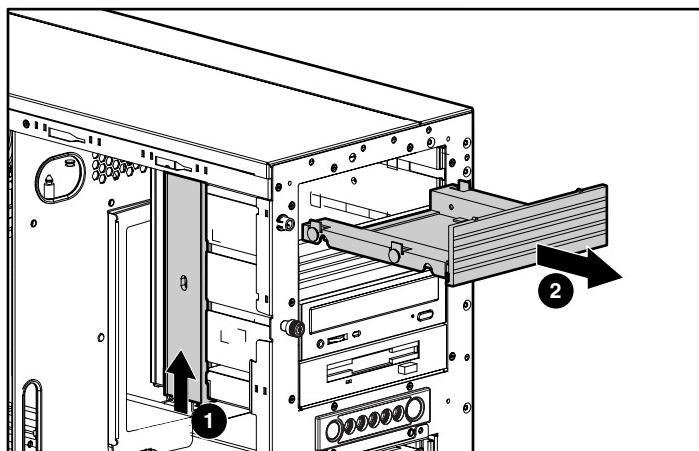
**NOTE:** The blanks must be removed from the chassis to install a storage device in its place. The tray on the blank is used to mount non-hot plug hard drives into removable media device bays.



**CAUTION:** Before removing a removable media device blank, be sure that the server is powered down, all cables are disconnected from the server, and the power cord is disconnected from the grounded (earthed) AC outlet.

To remove a removable media device blank from the front chassis:

1. Remove the access panel by following the applicable steps referenced earlier in this chapter for your tower or rack server.
2. Push up on the drivelock to release the blanks (1).
3. Gently pull the blank away from the front chassis, and then remove the blank (2).



**Figure 3-7: Removing a removable media device blank**

4. To replace a removable media device blank, reverse steps 1 through 3.

## Storage Devices

This section discusses removal and replacement procedures for the storage devices supported by this server.

Before installing a device, refer to “Tower Server Front Panel Components and Drive Bay Dimensions” or “Rack Server Front Panel Components and Drive Bay Dimensions” in Chapter 1, “Server Features,” for the locations and dimensions of the server drive bays.

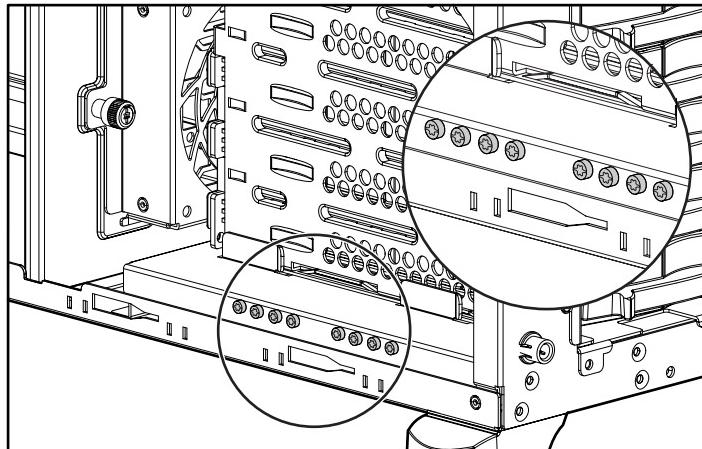


**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel or front bezel.

**IMPORTANT:** When you add or remove a component or change a security feature, you must reconfigure the server to recognize these changes. If the system configuration is incorrect, the server may not work properly, and you may receive error messages on the screen.

## Identifying Guide Screws

When installing drives in the removable media bay, you must install guide screws to ensure that the drives correctly align in the drive cage. HP has provided extra guide screws. They are located behind the side access panel of the server. Some options use 5.25 M3 metric screws and some use HD 6-32 screws. The metric screws supplied by HP are black.



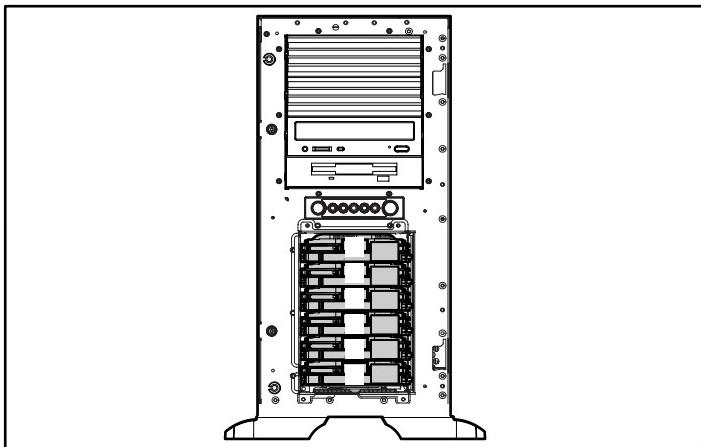
**Figure 3-8: Identifying guide screws**

## Installation Guidelines for SCSI Hard Drives

Consider the following guidelines when installing SCSI hard drives:

- Install drives into the bays in the following order: 0, 1, 2, 3, 4, 5.
- SCSI device IDs do not need to be assigned for hot-plug hard drives as the system will automatically perform that function.

For more information, refer to Figure 3-9 and Chapter 4, “Cabling Guidelines.”



**Figure 3-9: Hot-plug SCSI hard drive bay configuration**

## Installing and Removing a Hot-Plug Hard Drive

To install a hot-plug hard drive, first review the installation documentation that came with the drive.

1. For tower servers, open bezel door.
2. Slide the release latch (1) and remove the hard drive blank (2).

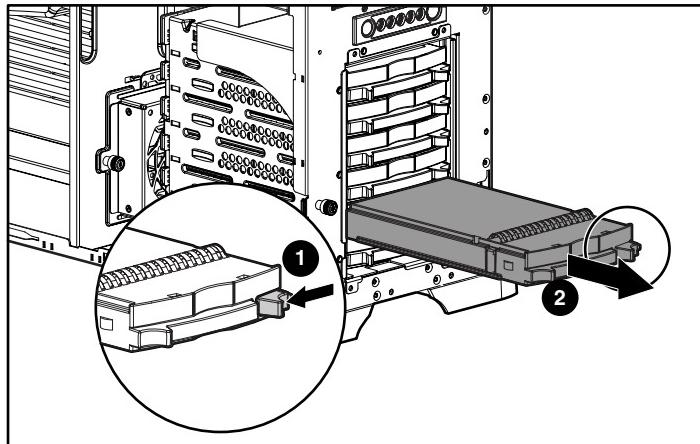
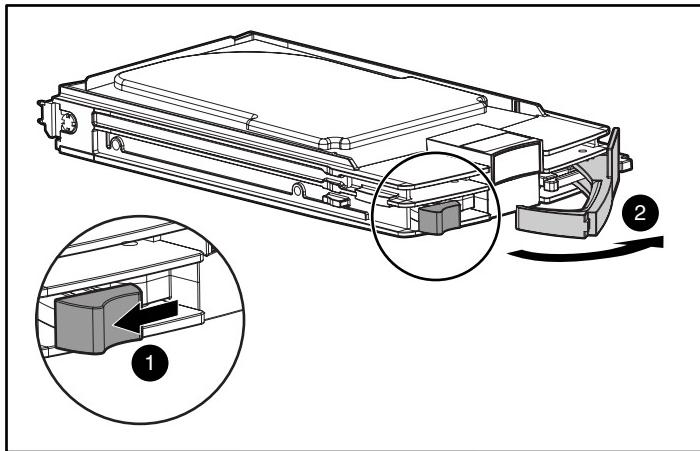


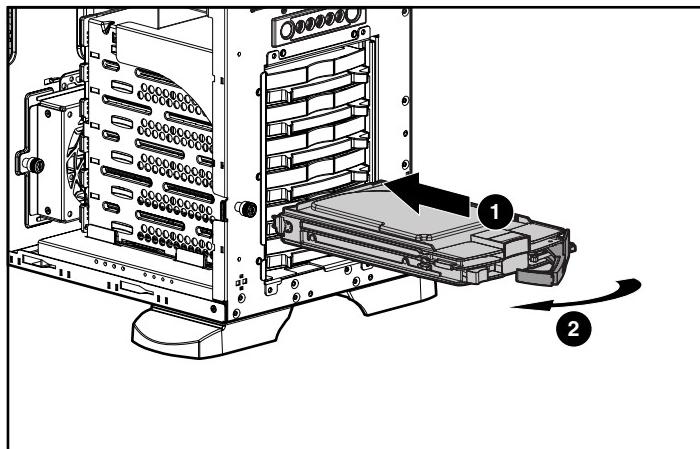
Figure 3-10: Removing the hard drive blank

3. Slide the hard drive release latch (1) and open the ejector lever (2).



**Figure 3-11: Opening the ejector lever**

4. Insert the hot-plug hard drive into the lowest available hot-plug drive bay (1), then close the ejector lever (2).



**Figure 3-12: Inserting the hot-plug hard drive and closing the ejector lever**

5. To remove a hot-plug hard drive, reverse steps 1 through 4.

**IMPORTANT:** A hard drive blank must be installed into any empty drive bay for the system to properly operate.

## Installing a Device into a Removable Media Bay

The server includes four removable media bays. The lower two bays are occupied with a 3.5-inch diskette drive and an IDE CD-ROM drive. The upper two removable media device bays are vacant. You can install two half-height devices or one full-height device into these bays.

### Installing a Half-Height Removable Media Device

To install a 5.25-inch device:



**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

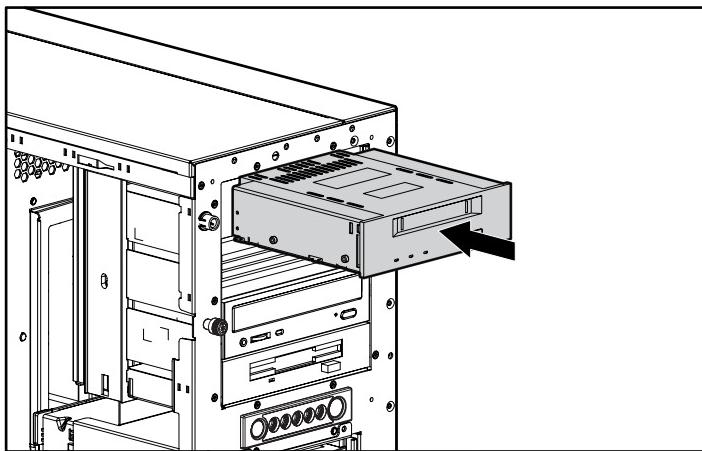
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1. Remove the access panel by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.

**NOTE:** For tower servers, the bezel door can be removed to simplify access.

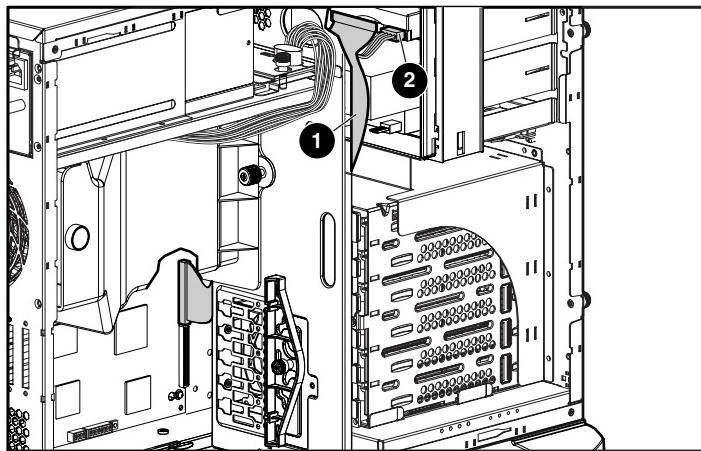
2. To configure the device, set the SCSI ID. You must manually set the SCSI ID on each device to a unique value. Refer to the documentation provided with the device for instructions on setting the SCSI ID.
3. Remove all terminating jumpers from third-party SCSI devices.
4. Install guide screws on the sides of the drive.

5. Slide the drive into the drive bay until it clicks into place.



**Figure 3-13: Installing a device mounted inside a removable media bay**

6. Connect the data cable (1) and power cable (2) to the back of the drive.



**Figure 3-14: Connecting the data and power cables**

7. Connect the data cable into a SCSI controller channel (secondary SCSI channel shown in Figure 3-14).

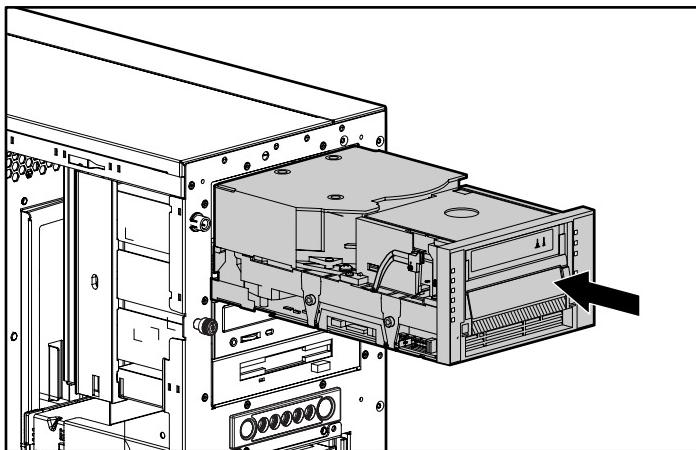
## Installing a Tape Drive

To install a tape drive:



**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

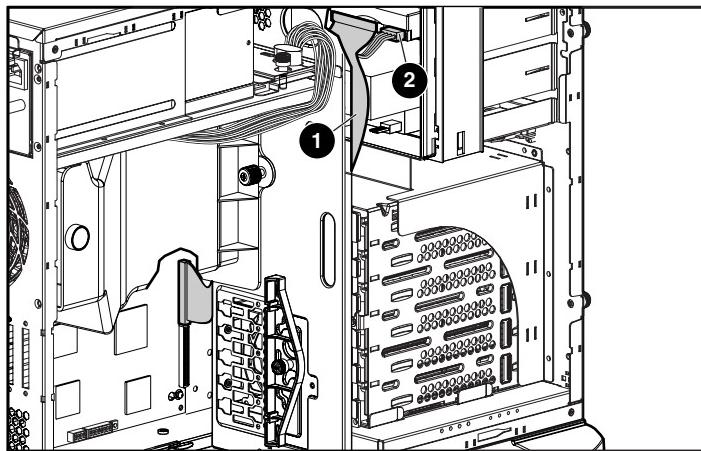
1. Remove the access panel (and bezel door if applicable) by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Install guide screws on the sides of the drive.
3. To configure the device, set the SCSI device ID. You must manually set the SCSI device ID on each device to a unique value in the range of 0 through 5 for each SCSI bus. Refer to the documentation provided with the drive for instructions on setting the SCSI device ID.
4. Slide the drive into the drive bay until it clicks into place.



**Figure 3-15: Installing a tape drive (DLT)**

**IMPORTANT:** HP recommends installing the tape drive on a separate SCSI cable to avoid a decrease in performance of other SCSI devices.

5. Connect the data cable (1) and power cable (2) to the back of the drive.



**Figure 3-16: Connecting the data and power cables to the tape drive**

6. Connect the data cable into a SCSI controller channel (secondary SCSI channel shown in Figure 3-16).

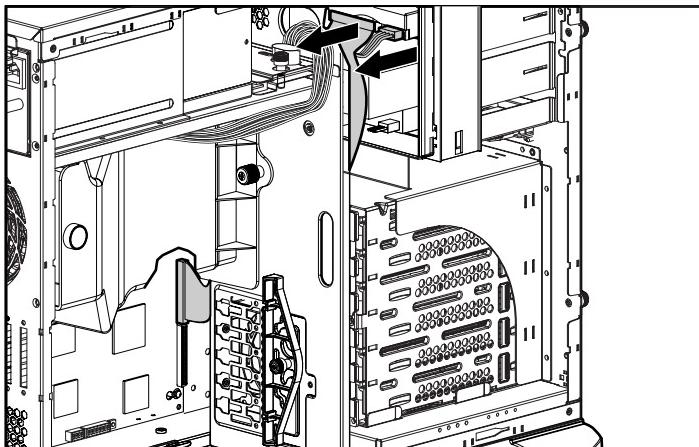
## Removing a Device from Removable Media Bay

To remove a tape drive or other device:



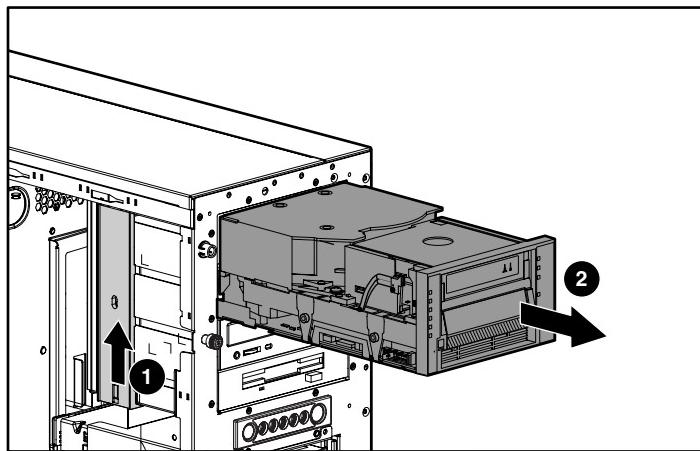
**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

1. Remove the access panel (and bezel door if applicable) by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Disconnect the power cable and data cable from the back of the tape drive.



**Figure 3-17: Disconnecting the power and data cables**

3. While pushing the drivelock up (1), pull the tape drive out of the drive bay (2).

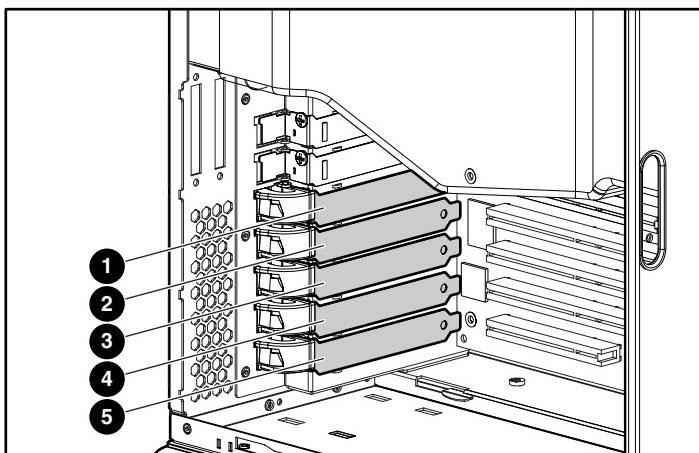


**Figure 3-18: Releasing the tape drive**

4. Remove the guide screws on the sides of the drive.
5. Install drive blanks into any empty bays.
6. Reinstall the access panel.

## Installing an Expansion Board

Figure 3-19 and Table 3-2 identify the location of expansion slots.



**Figure 3-19: Locating expansion slots**

**Table 3-2: Expansion Slots**

Item	Slot Type	Slot Number
1	3.3 V, 64-bit PCI-X 100 MHz (bus 2)	1
2	3.3 V, 64-bit PCI-X 100 MHz (bus 2)	2
3	3.3 V, 64-bit PCI-X 100 MHz (bus 5)	3
4	3.3 V, 64-bit PCI-X 100 MHz (bus 5)	4
5	5.0 V, 32-bit PCI 33 MHz	5

**NOTE:** Slots 1, 2, 3 and 4 are optimized for PCI-X 100 add-in cards.

This server supports two independent 64-bit, 133 MHz PCI-X segments (buses) for increased performance and platform flexibility. For optimum load balancing when installing PCI-X expansion boards, populate expansion slots across different buses before populating two slots on the same bus. Refer to Figure 3-19 and Table 3-2 to identify the slot positions by bus number.

**IMPORTANT:** Always pair expansion boards of the same speed on the same bus for optimum performance. If expansion boards of different speeds are installed on the same bus (for example, 66-MHz PCI and 100-MHz PCI-X boards), the server operates both boards at the lower frequency.

To install an expansion board:



**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

1. Remove the access panel by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Loosen the thumbscrew of the expansion board retainer (1), then pull the retainer out and away from the chassis (2).

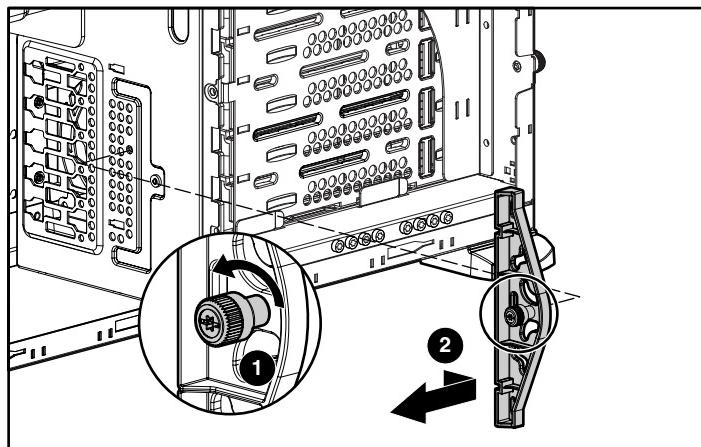
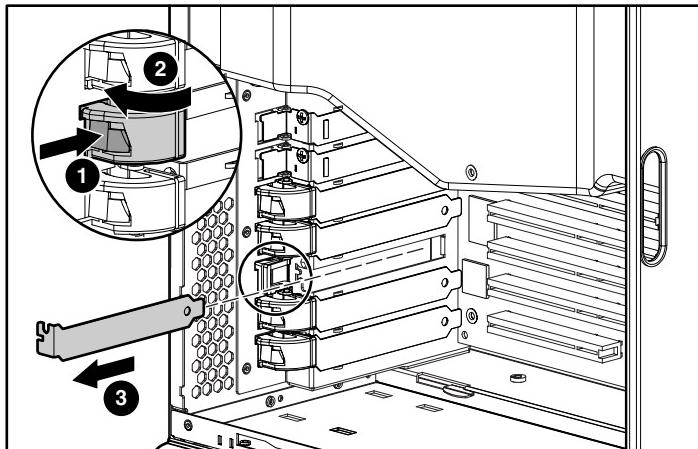


Figure 3-20: Removing the expansion board retainer

3. Press on the top of the expansion slot latch (1), then open the latch toward the rear of the chassis (2).
4. Remove the expansion slot cover (3).

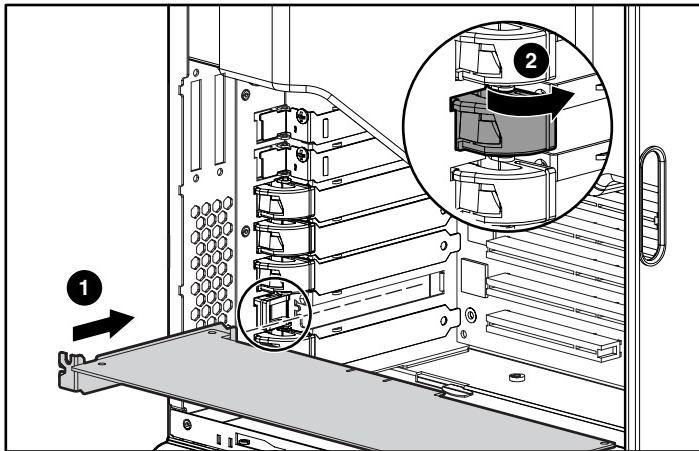
**IMPORTANT:** It may be necessary to remove the slot cover next to the slot in which you are installing a board.



**Figure 3-21: Removing the expansion slot cover**

**IMPORTANT:** Be sure to insert expansion boards into the appropriate type of expansion slot. The 32-bit expansion boards can be inserted into either the 32-bit slot or 64-bit slots, however the 64-bit expansion boards must be inserted into 64-bit expansion slots.

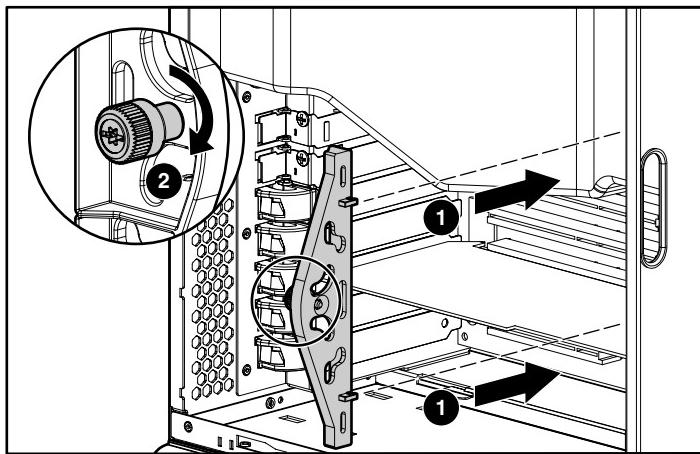
5. Insert the expansion board (1).
6. Close the expansion slot latch to secure the board (2).



**Figure 3-22: Installing an expansion board**

7. Connect any cables to the expansion board.

8. Reinstall the expansion board retainer (1), then tighten the thumbscrew (2).



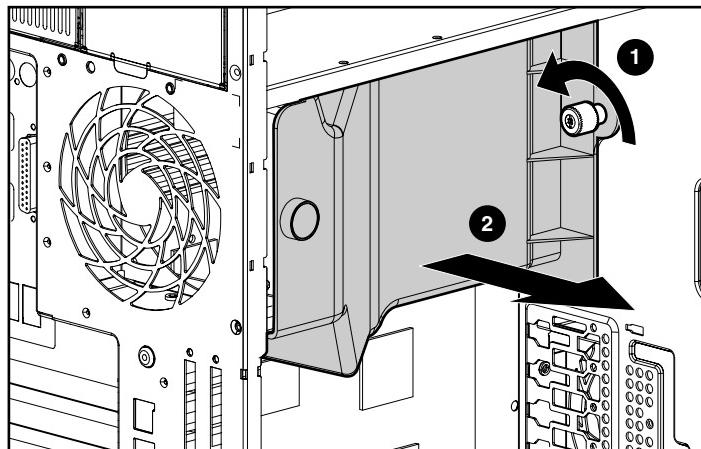
**Figure 3-23: Reinstalling the expansion board retainer**

9. Reinstall the access panel.
10. To remove an expansion board, reverse steps 1 through 9.

## Removing the Fan Baffle

To remove the fan baffle:

1. Remove the access panel by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Remove expansion board retainer by following steps referenced earlier in this chapter in section “Installing an Expansion Board.”
3. Loosen the thumbscrew that secures the baffle to the fan (1).
4. Slide the baffle out and away from the chassis (2).



**Figure 3-24: Removing the fan baffle**

## Memory Modules

### Technical Information and Important Guidelines



**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.



**CAUTION:** To prevent damage to the system when handling components, see Appendix B, "Electrostatic Discharge."



**CAUTION:** When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

When installing DIMMs, you must follow these guidelines:

- DIMMs must be industry-standard 184-pin PC2100 DDR DIMMs. The DDR DIMMs must support CAS Latency 2, or greater. They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information.
- Do not mix ECC and non-ECC DDR DIMMs. If different types of DIMMs are mixed, the system does not properly function.
- A DIMM can be installed only one way. Be sure to match the two key slots on the DIMM with the tab on the DIMM socket. Push the DIMM down into the DIMM socket, ensuring that it is fully inserted and properly seated.
- DIMMs can be installed in pairs or singularly. Installing DIMMs in identical pairs allows for the activation of the Memory Interleaving capability (refer to "Interleaving and Non-Interleaving Memory Configuration" later in this chapter).

## **Interleaving and Non-Interleaving Memory Configuration**

This server supports both interleaving and non-interleaving memory configurations. Interleaving memory increases bandwidth by allowing simultaneous access to more than one block of data (for example, overlapping Read-Writes). This is accomplished by dividing the system memory between pairs of DIMMs and Writing-Reading blocks of data to/from both simultaneously. In order to take advantage of interleaving memory, identical DIMMs must be installed in pairs. DIMMs can also be installed singularly if memory interleaving is not desired.

### **Activating Interleaving Memory**

Interleaving memory functionality is automatically activated whenever two identical DIMMs are detected in sockets 1 and 2. If sockets 3 and 4 are populated, it must be with identical DIMMs as well. If identical DIMMs are installed in sockets 1, 2 and 3, this is considered non-interleaving. You must have an even number of DIMMs installed to support interleaving.

The server identifies memory mode in two ways. At post, the ROM will display a interleaving or non-interleaving message. In addition, The RBSU main menu will identify the memory mode following the `xxxMB Memory Installed` message in the information block to the right of the menu options list. Refer to Chapter 5, “Server Configuration and Utilities” for more information.

### **Interleaving Memory Guidelines**

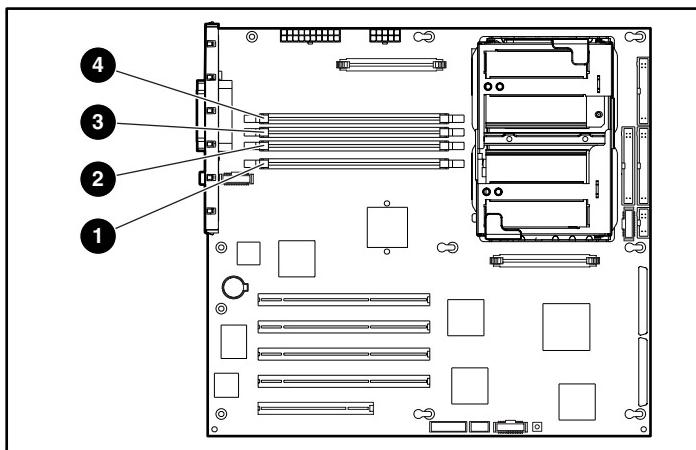
For interleaving memory functionality, follow the guidelines noted below:

- Memory must be installed in identical pairs. Pairs are considered to be DIMMs installed in sockets 1 and 2 or 3 and 4.
- Populate DIMM sockets 1 and 2 first before installing in sockets 3 and 4 (if needed). Refer to Figure 3-25 and Table 3-3.

## Installing a Memory Module

This server supports up to 8 GB of memory. Memory can be installed singularly in DIMM socket position 1 (non-interleaving memory) or in combinations of 128-MB, 256-MB, 512-MB, 1-GB, and 2-GB modules (to support interleaving memory functionality). The server has four DIMM sockets located on the system board (refer to Figure 3-25).

**IMPORTANT:** DIMMs do not need to be installed in pairs (unless memory interleaving is desired). If interleaving memory capability is desired, follow the appropriate DIMM installation guidelines noted earlier in this chapter.



**Figure 3-25: Locating DIMM sockets**

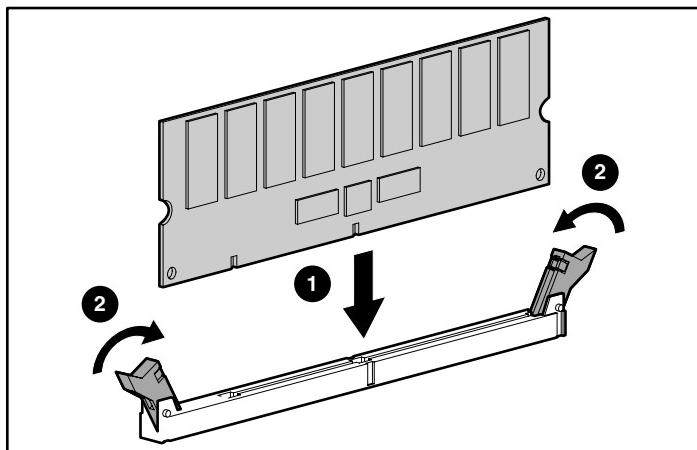
**NOTE:** Refer to Appendix E, “LED Indicators, Switches, and Jumpers” for a description of the DIMM LEDs.

**Table 3-3: DIMM Sockets**

<b>Item</b>	<b>Component</b>
1	DIMM socket 1, Pair 1
2	DIMM socket 2, Pair 1
3	DIMM socket 3, Pair 2
4	DIMM socket 4, Pair 2

To install a DIMM:

1. Remove the access panel by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Remove the fan baffle by performing the steps in “Removing the Fan Baffle” earlier in this chapter.
3. Press outward on both latches of the DIMM socket at the same time.
4. Insert the DIMM into the socket (1).
5. Return latches to the upright position (2).



**Figure 3-26: Installing a DIMM**

6. Reinstall the fan baffle.
7. Reinstall the access panel.

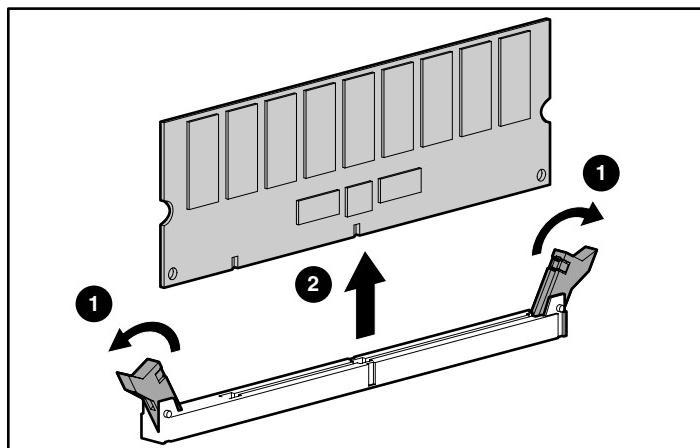
## Removing a Memory Module

To remove a DIMM:



**CAUTION:** Before removing the access panel, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet.

1. Remove the access panel by following the steps in the section applicable to your tower or rack server at the beginning of this chapter.
2. Remove the fan baffle by performing the steps in “Removing the Fan Baffle” earlier in this chapter.
3. Press outward on both latches of the DIMM socket at the same time. This step releases the DIMM and pushes it partially out of the socket (1).
4. Lift the DIMM from the socket (2).



**Figure 3-27: Removing a DIMM**

5. Reinstall the fan baffle.
6. Reinstall the access panel.

## Processors and Processor Power Modules



**WARNING:** To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

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**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

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**CAUTION:** Static electricity can damage electronic components of the server. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded metal object.

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For written instructions and illustrated procedures on installing or removing a processor or Processor Power Module (PPM), refer to the installation documentation that came with the option kit.

### Installing a Processor with Heatsink in the Processor Cage

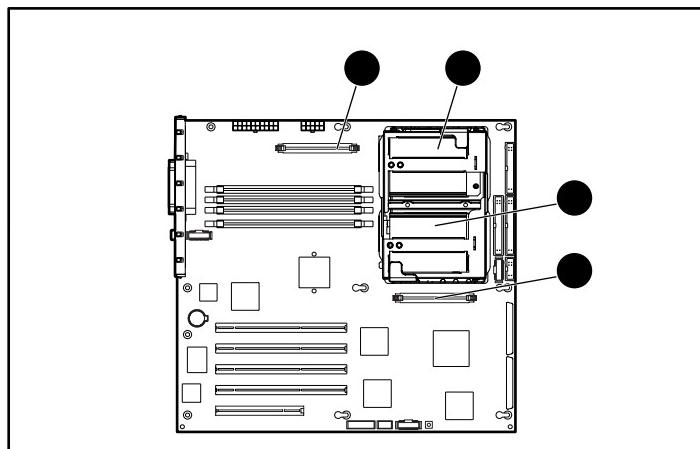
This server supports the installation of a second Intel Xeon processor for enhanced performance. Processor option kits available for the server consist of an Intel Xeon processor with heatsink and a Power Processor Module (PPM).

**IMPORTANT:** Only install the specific PPM provided in the option kit with your processor.

Observe the warnings and cautions provided in the option kit documentation and in this guide. To install the processor and heatsink assembly:

1. Be sure that all critical data has been backed up.
2. Be sure that the server has the most current ROM version. To update your ROM, refer to [www.compaq.com/support/files](http://www.compaq.com/support/files).
3. Power down the server and remove the access panel as described in the section applicable to your tower or rack server earlier in this chapter.
4. Remove the internal fan baffle to gain access to the processor sockets. Refer to “Removing the Fan Baffle” earlier in this chapter.

5. Locate the processor socket and corresponding PPM slot on the system board.

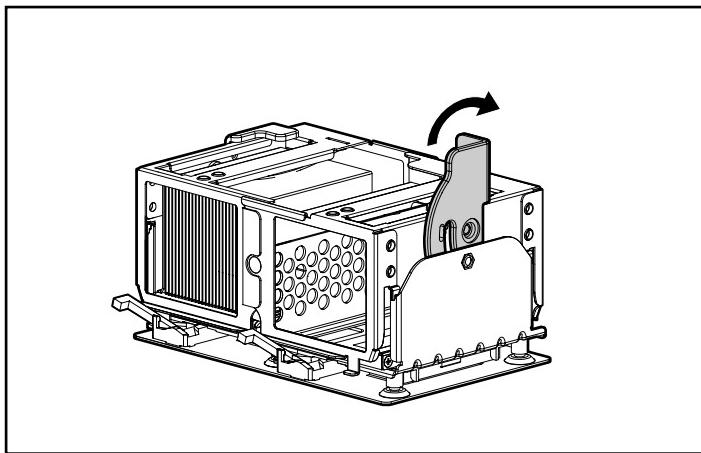


**Figure 3-28: Locating the processor sockets and Processor Power Module (PPM) slots**

**Table 3-4: Processor Sockets and Processor Power Module Slots**

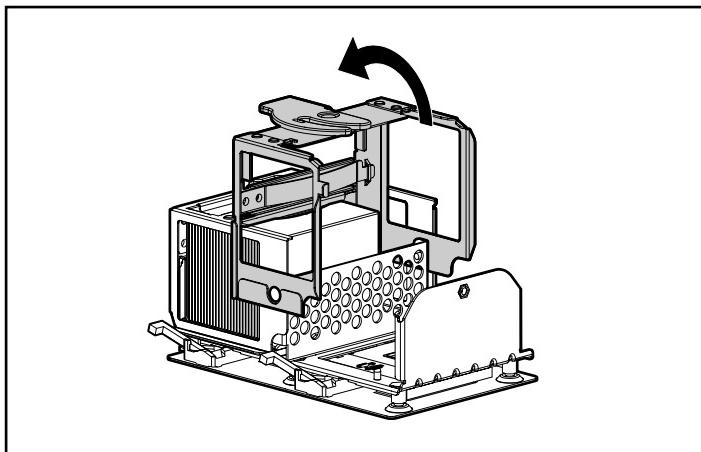
Item	Description
1	PPM slot 1
2	Processor socket 1
3	Processor socket 2
4	PPM slot 2

6. Pull up on the processor cage retaining bracket latch.



**Figure 3-29: Lifting the processor cage retaining bracket latch**

7. Lift processor cage upward.

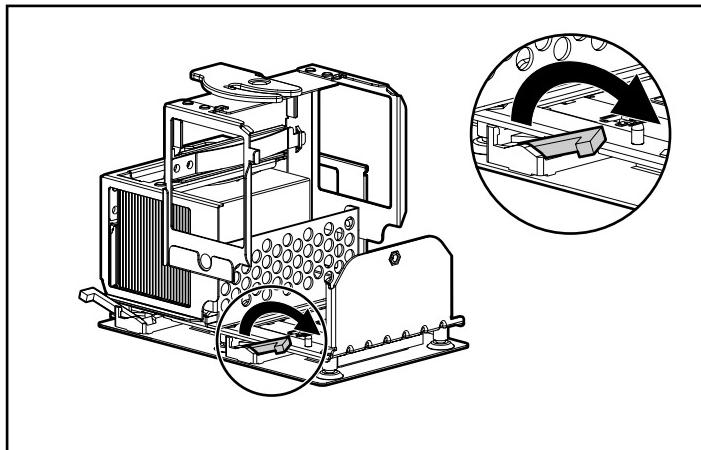


**Figure 3-30: Lifting the processor cage**

8. Open the processor locking lever.



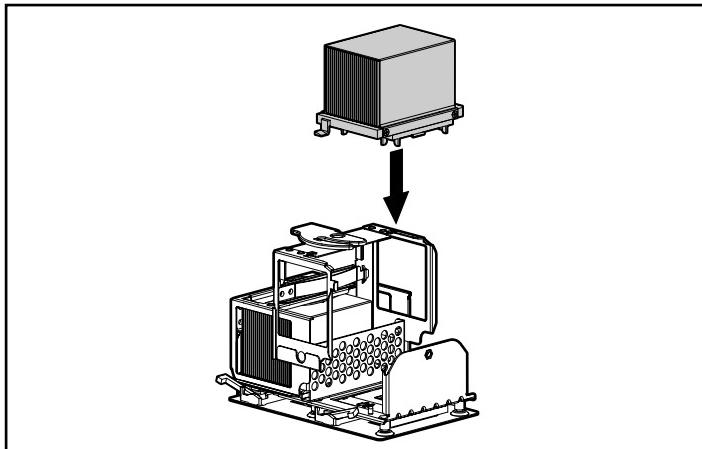
**CAUTION:** Failure to open the processor locking lever all the way prevents the processor from seating during installation and leads to hardware damage.



**Figure 3-31: Opening the processor locking lever**

9. Install the processor/heatsink assembly into the available processor socket:
  - a. Determine the correct processor orientation by observing the three guide pins located on the bottom surface of the processor retaining cage and the three corresponding guide holes on the processor/heatsink assembly.
  - b. Insert the processor/heatsink assembly into the processor socket.

**IMPORTANT:** If the processor locking lever is not secured, the processor retaining bracket will not close properly.

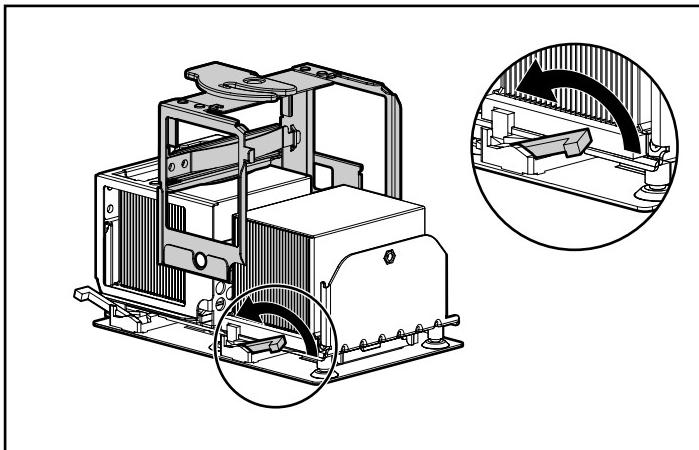


**Figure 3-32: Installing the processor/heatsink assembly**

10. Close the processor locking lever.

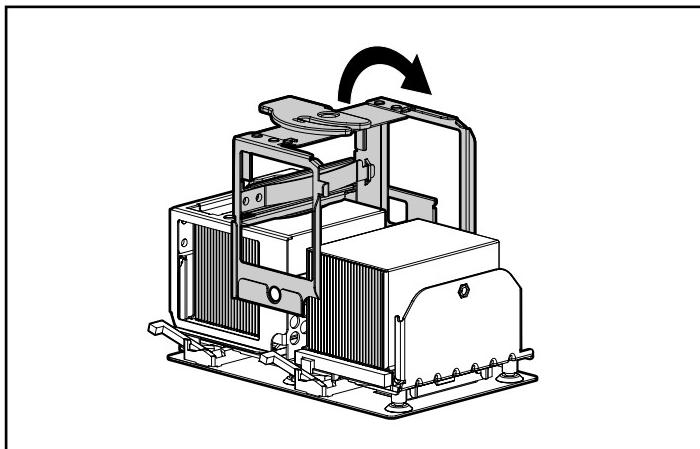


**CAUTION:** To prevent possible server malfunction or damage to the equipment, be sure to completely close the processor locking lever.

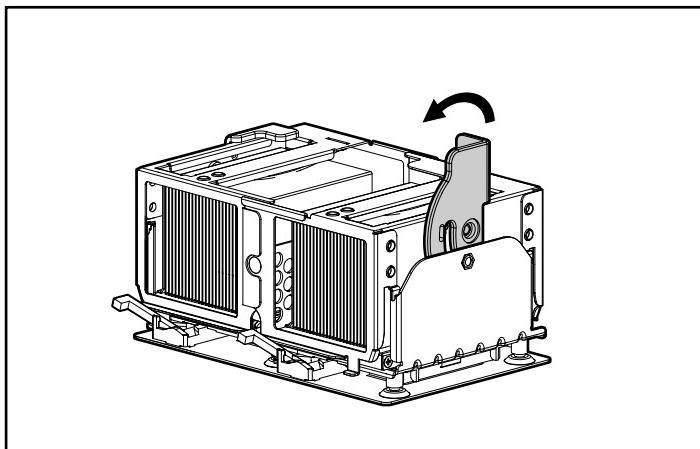


**Figure 3-33: Closing the processor locking lever**

11. Lower the processor retaining cage into position over the processor and secure it by lowering the processor retaining bracket latch.



**Figure 3-34: Lowering the processor retaining cage**



**Figure 3-35: Lowering the processor cage retaining bracket latch**

12. Install the new processor's PPM as outlined in the next section.

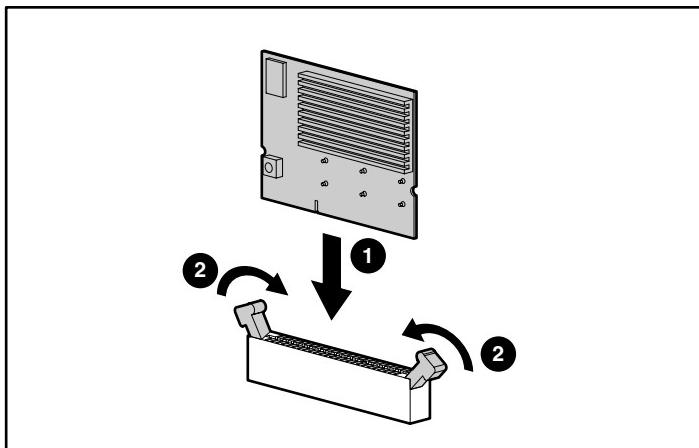
13. Reinstall the internal fan baffle. Refer to “Removing the Fan Baffle” earlier in this chapter.

## Installing a Processor Power Module

**IMPORTANT:** A new PPM must always be installed with a new processor.

To install a PPM:

1. Locate the second PPM slot and position the PPM above the slot. The PPM is keyed to fit only one way in the slot.
2. Be sure the latches are open before pressing the PPM into the slot (1).
3. Press evenly on the PPM to insert it into the slot until latches snap up to secure the module (2).



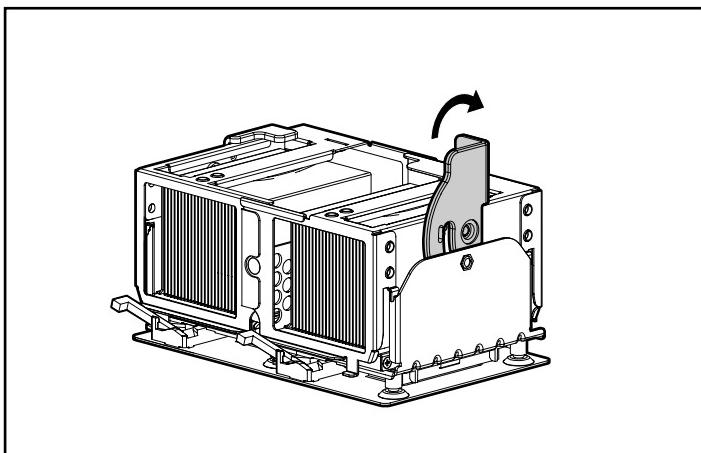
**Figure 3-36: Installing a Processor Power Module (PPM)**

**NOTE:** PPMs with the same part number may look different, but are functionally equivalent.

## Removing a Processor

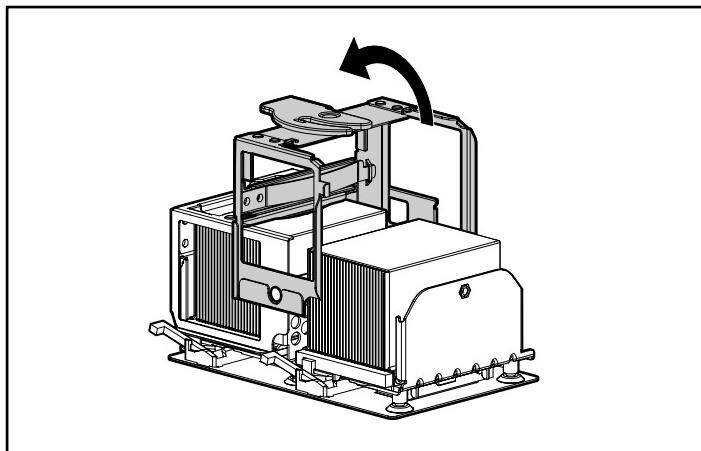
To remove a processor:

1. Remove the access panel by following the steps in the section applicable to your tower or rack server earlier in this chapter.
2. Remove the fan baffle by performing the steps in “Removing the Fan Baffle” earlier in this chapter.
3. Locate the processors and PPMs, as shown in Figure 3-28 and Table 3-4.
4. Pull up on the processor cage retaining bracket latch.



**Figure 3-37: Pulling up the processor cage retaining bracket latch**

5. Lift up the processor cage.

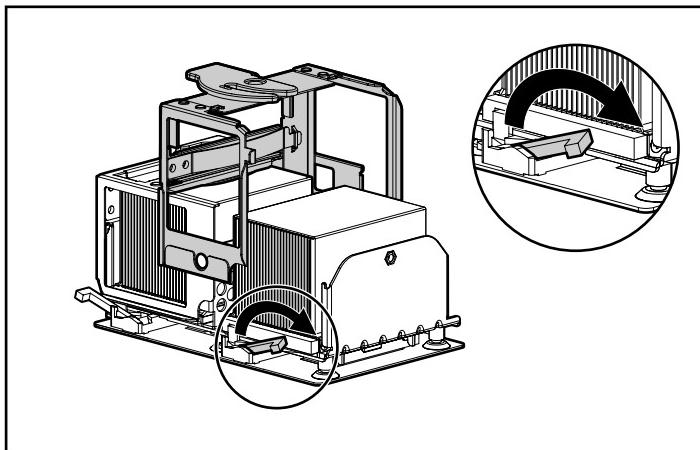


**Figure 3-38: Lifting the processor cage**

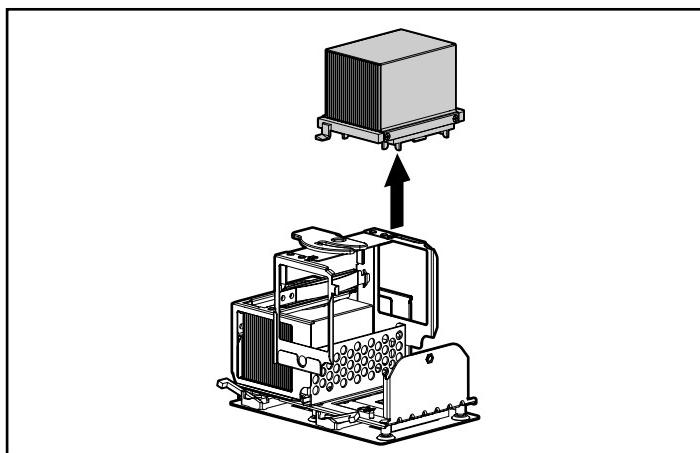
6. Remove the processor:
  - a. Lift the processor locking lever upward to release the processor from the socket (Figure 3-39).
  - b. Remove the processor/heatsink assembly (Figure 3-40).



**CAUTION:** If replacing a processor/heatsink assembly, failure to open the processor locking lever all the way prevents the processor from seating during installation and leads to hardware damage.



**Figure 3-39: Lifting the processor locking lever**



**Figure 3-40: Removing the processor/heatsink assembly**



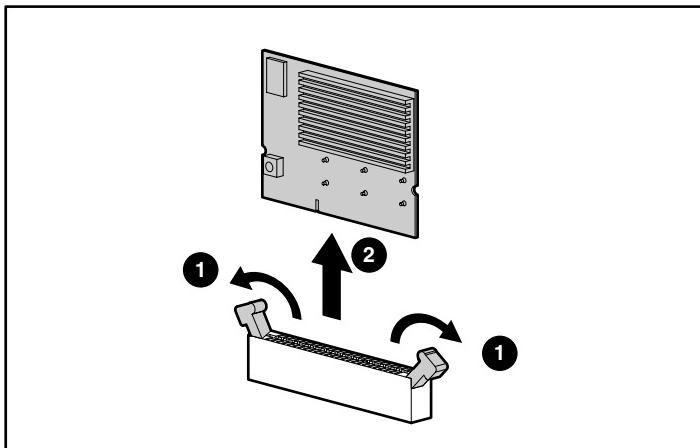
**WARNING:** Heatsinks may be hot. Allow processor/heatsink assemblies to cool before attempting to remove them.

7. Close the processor locking lever, lower the processor cage, and secure it with the processor retaining bracket latch.
8. Remove the processor's PPM as outlined later in this chapter.
9. Reinstall the fan baffle.
10. Reinstall the access panel.

## Removing a Processor Power Module

To remove a Processor Power Module:

1. Open the latches of the PPM slot (1).
2. Remove the PPM from the slot (2).



**Figure 3-41: Removing a Processor Power Module (PPM)**

**NOTE:** PPMs with the same part number may look different, but are functionally equivalent.

## Battery Replacement



**WARNING:** The system board contains a lithium battery. There is a risk of fire and chemical burn if the battery is improperly handled. Do not disassemble, crush, puncture, short external contacts, dispose of in water or fire, or expose it to temperatures higher than 60°C (140°F).



**CAUTION:** To prevent damage to equipment or loss of information, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.



**CAUTION:** Static electricity can damage electronic components of the server. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded (earthed) metal object.

This server has nonvolatile memory that requires a battery to retain system information. The battery is located on the system board.

### Replacing the System Board Battery

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. When replacing a battery, use a CR2032 3-volt lithium coin cell battery.

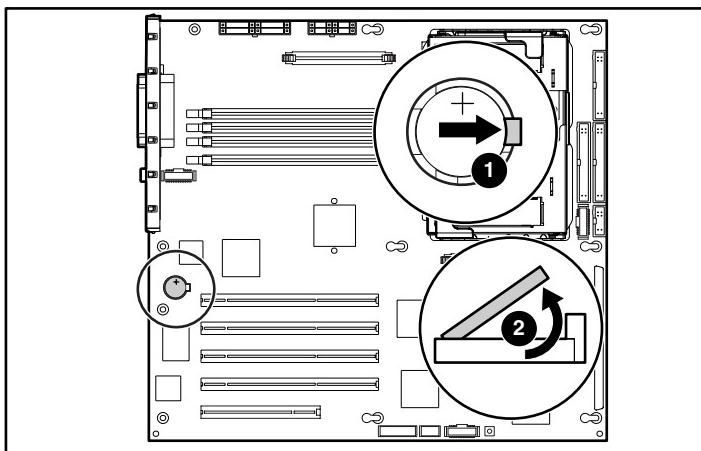
To replace the lithium battery:

1. Remove the access panel by following the steps applicable to your tower or rack server earlier in this chapter.
2. Locate the battery on the system board. See Figure 3-42 for the battery location.

After you have completed the battery installation, restart the system and run RBSU by pressing the **F9** key to reconfigure your system.

**NOTE:** If you have expansion boards installed, you may need to remove them to access the battery. Refer to “Installing an Expansion Board” earlier in this chapter.

3. Press the release lever (1), and then slide the battery out of the holder (2).



**Figure 3-42: Removing the battery from the system board**

4. Snap the replacement battery into the holder in the proper position.

**IMPORTANT:** Positive polarity (+) should be positioned facing out.

5. Reinstall the access panel.
6. Run the ROM-Based Setup Utility (RBSU) to reconfigure your system.

## Installing the Hot-Plug Redundant Power Supply

To install the optional hot-plug redundant power supply:



**WARNING:** To reduce the risk of personal injury or damage to the equipment, the installation of power supplies should be performed only by individuals who are qualified in servicing server equipment and trained to deal with products capable of producing hazardous energy levels.

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**WARNING:** To reduce the risk of personal injury from hot surfaces, observe the thermal labels on each power supply or module.

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**WARNING:** To reduce the risk of injury from electric shock hazards, do not open power supplies. Refer all maintenance, upgrades, and servicing to qualified personnel.

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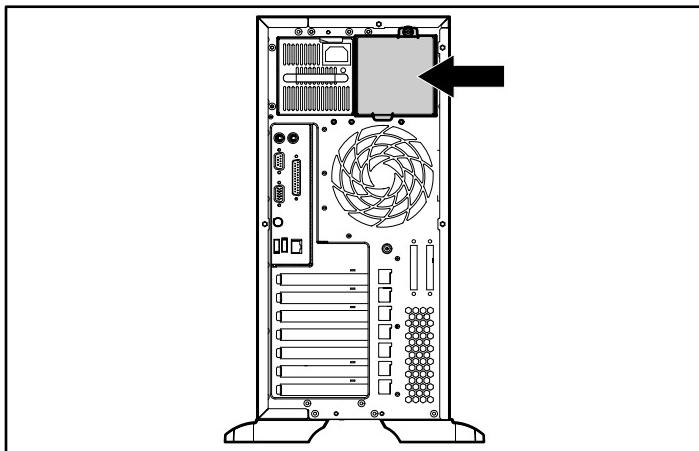


**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure.

---

1. Identify the redundant power supply bay at the back of the server.

**IMPORTANT:** Power supplies of these servers are hot-pluggable. When using the redundant power supply option, it is not necessary to power down the server before removing or installing a power supply.



**Figure 3-43: Identifying the redundant power supply bay**

2. Remove the thumbscrew that secures the redundant power supply blank, and then lift the blank from the back of the server.



**WARNING: To reduce the risk of electric shock or damage to the equipment, do not connect AC power cords to uninstalled power supplies.**

3. Slide the power supply into the power supply bay, then apply pressure to the power supply until the release/lock lever clicks the power supply securely into the bay.
4. Connect the AC power cord to the power supply.
5. Be sure that the power supply and the redundant power supply LEDs are green. For more information, refer to Appendix E, “LED Indicators, Switches, and Jumpers.”

---

## Cabling Guidelines

This chapter provides an overview of the internal cabling of the HP ProLiant ML350 Generation 3 server chassis. It also includes information on how to cable SCSI, IDE, and removable media devices in the system, as well as information about all critical system cabling. If external cabling is required, refer to the documentation included with your external storage option device.

## Storage Device Installation Guidelines

Consider the following guidelines when adding SCSI devices:

- As a general rule, a maximum of seven devices may be added per channel. The server is equipped with two integrated Ultra3 SCSI channels.
- The configuration settings on each SCSI device should be set to the SCSI ID of the bay (Bay 0 = SCSI ID 0) that it will occupy.
- If only one SCSI hard drive is used, it should be installed in the lowest-numbered bay (0).
- Be sure to remove all terminating jumpers from third-party SCSI devices.



**CAUTION:** To prevent damage to the equipment, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before installing devices.

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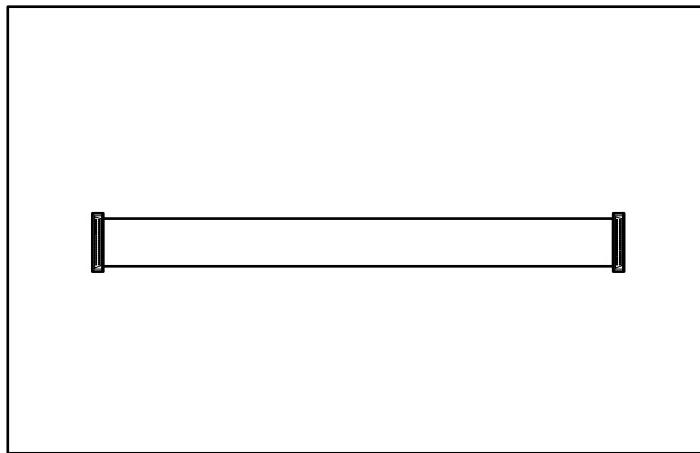
**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to Appendix B, “Electrostatic Discharge,” for more information.

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## Identifying SCSI Components

### Hot-Plug Hard Drive SCSI Cable

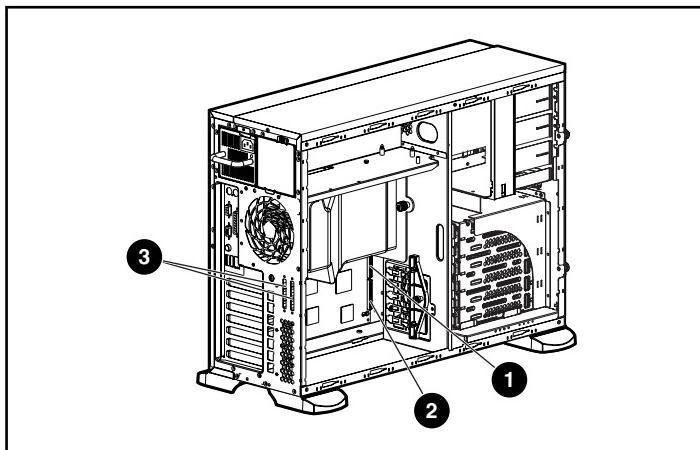
The SCSI cable shown in Figure 4-1 is included with the server. The SCSI cable connects the hot-plug drive cage to the SCSI controller. The hot-plug hard drive cage has built-in termination.



**Figure 4-1: Hot-plug hard drive SCSI cable**

## **Internal SCSI Components**

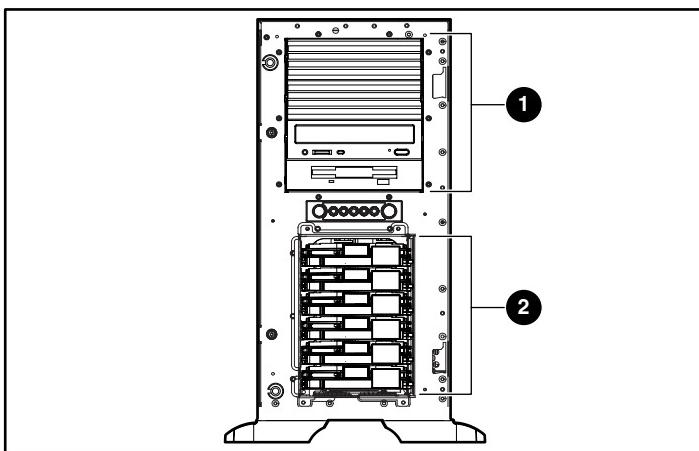
Before cabling the server, note the removable media and hard drive cage locations, as shown in Figure 4-2, Figure 4-3, Table 4-1, and Table 4-2. For additional information about installing optional SCSI devices, refer to the documentation included with the SCSI devices.



**Figure 4-2: Internal SCSI components**

**Table 4-1: Internal SCSI Component Locations**

<b>Number</b>	<b>Description</b>
1	SCSI connector—secondary
2	SCSI connector—primary
3	SCSI connector knockouts



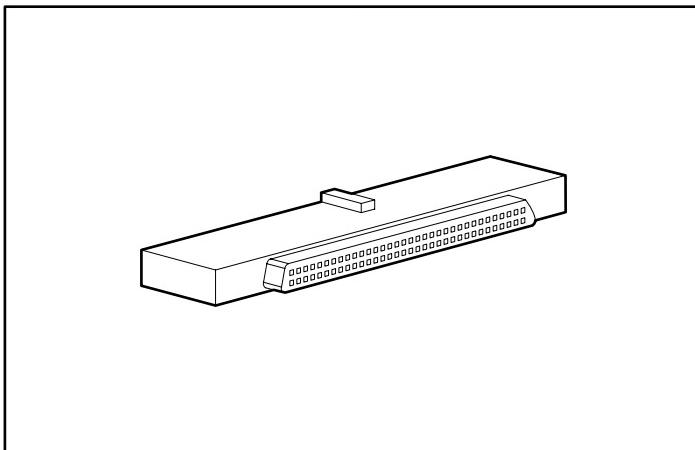
**Figure 4-3: Media bays and hard-drive cage**

**Table 4-2: Media Bays and Hard-Drive Cage**

Number	Description
1	Removable media area
2	Hard-drive cage

## **68-to-50 Pin SCSI Adapter**

If installing a device that uses a Fast SCSI-2 interface, you must provide a 68-to-50 pin SCSI adapter, shown in Figure 4-4. This adapter should be installed between the 50-pin interface on the device and the 68-pin SCSI cable connected to the SCSI channel on the system board.

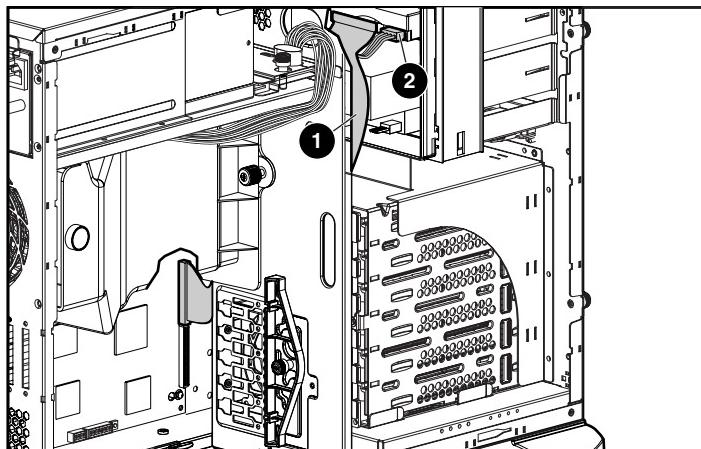


**Figure 4-4: 68-to-50 pin (wide-to-narrow) SCSI adapter**

## Cabling SCSI Devices in the Removable Media Area

The following steps detail the procedure for cabling an integrated SCSI controller (primary) to a removable media or other device:

1. Follow the steps in the section “Installing a Device into a Removable Media Bay” in Chapter 3, “Hardware Options Installation.” Be sure that the SCSI ID is uniquely set on each device.
2. Locate the SCSI cable that is attached to the secondary SCSI channel.
3. Install the next available connector to the device (1).
4. Install the next available power connector to the device (2).



**Figure 4-5: Cabling a SCSI device**

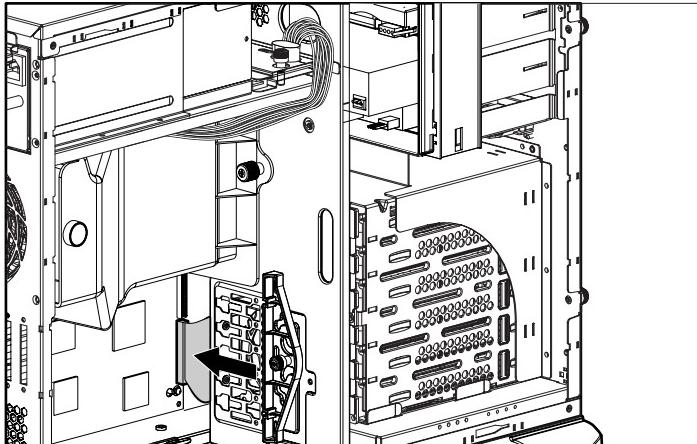
## **Cabling a SmartArray or other RAID Controller**

Many configurations are possible when SCSI controllers are added. This section outlines the procedure for connecting internal hard drives to a SCSI controller option or a SmartArray Controller and assumes that the controller option or SmartArray Controller is already installed.

If hard drives and the SCSI or SmartArray Controller are not already installed, follow the steps in the sections “Installing and Removing a Hot-Plug Hard Drive” and “Installing an Expansion Board” in Chapter 3, “Hardware Options Installation.”

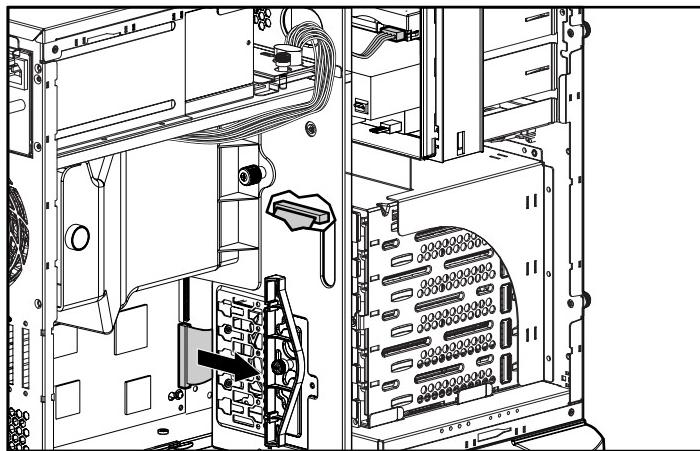
To cable a SmartArray or other RAID controller:

1. Locate the SCSI cable that is connected to the primary SCSI controller channel.



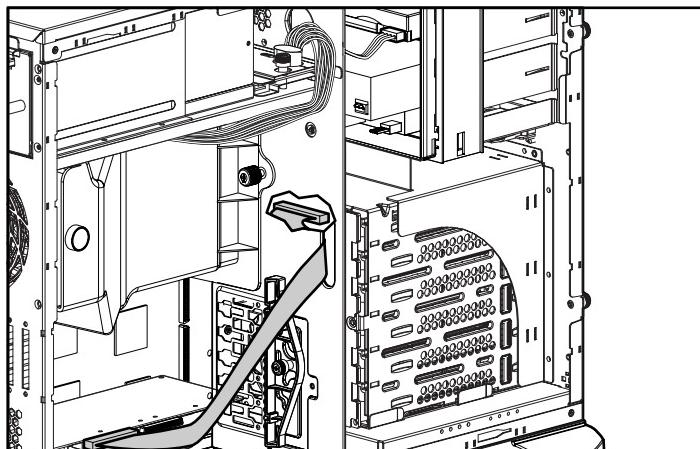
**Figure 4-6: Locating the SCSI cable**

2. Remove the SCSI cable from the SCSI primary connector on the system board.



**Figure 4-7: Removing the SCSI cable from the primary SCSI connector**

3. Reconnect the SCSI cable to either the SCSI controller option or SmartArray Controller.



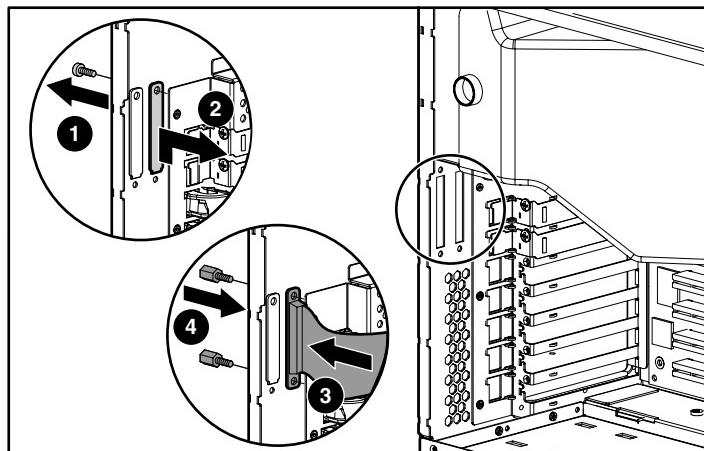
**Figure 4-8: Connecting the SCSI cable to a SCSI controller option or SmartArray Controller**

**NOTE:** Both SCSI channels are self-terminating. If you choose to not use one or both of the SCSI channels, you do not need to terminate the unused channel(s).

## Installing an Internal-to-External SCSI Connector

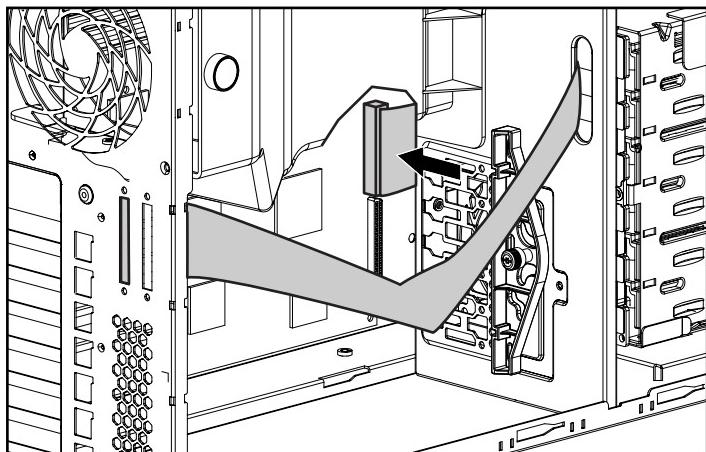
If you are not using one or both SCSI channels (primary or secondary) internally or you install a SCSI or SmartArray option card, you may install an internal-to-external SCSI connector (HP Part Number 159547-B22) in the SCSI knockout locations on the rear of the chassis. To install an internal-to-external SCSI connector, perform the following steps:

1. Using a Torx T-15 screwdriver, remove the screw holding the SCSI knockout cover plate (1), and then remove the cover plate (2).
2. Insert the SCSI connector into the open area (3). Secure the external SCSI connector to the chassis using the screws provided with the external SCSI connector option kit (4).

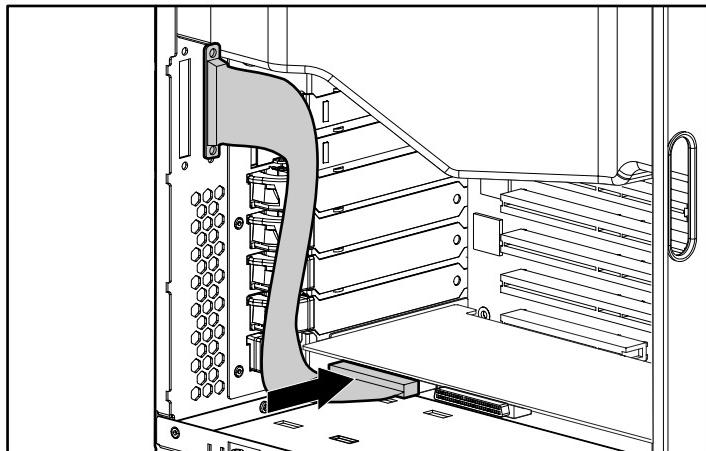


**Figure 4-9: Installing an internal-to-external SCSI connector**

3. Secure the internal-to-external SCSI connector cable to either internal SCSI channel (primary or secondary) or to the SCSI channel of an option card.



**Figure 4-10: Connecting the cable to SCSI channel on the system board (primary or secondary)**



**Figure 4-11: Connecting the cable to SCSI channel of an option card**

## **Connecting ATA or ATAPI Devices to the Integrated IDE Controller**

This server includes one IDE cable (the Cable Select Cable) that can connect up to two ATA or ATAPI devices to the system through the integrated IDE controller. This cable has three clearly labeled connectors. If only one IDE device is connected to the system, it must be secured to the cable connector labeled Drive 0. All IDE devices in the system should have their configuration jumpers set to “Cable Select” or “CS.”

**IMPORTANT:** If your network operating system is Novell NetWare, HP recommends that you connect your CD-ROM to the primary IDE channel and to the Drive 0 connector on the IDE cable.

**NOTE:** ATA (IDE) hard drives are not supported.

## Connecting the System Fans

The two system fans are an integral part of the server system design. Proper cabling of the fans helps to avoid potential server failure and operating system error messages.

Connect the system fans to the system board. Connect the CPU fan to connector (1) and the I/O fan to connector (2).

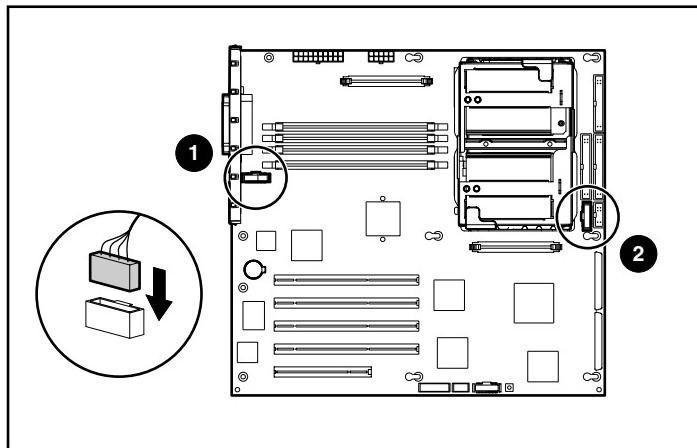


Figure 4-12: Connecting the two system fans

## Server Configuration and Utilities

This chapter provides information about the following utilities and support tools included with your HP ProLiant ML350 Generation 3 server:

- ROM-Based Setup Utility
- Redundant ROM Support
- ROMPaq
- SmartStart Software
- SmartStart Diskette Builder
- Insight Manager
- Survey Utility
- Diagnostics Utility
- Automatic Server Recovery (ASR)
- Power-On Self-Test (POST)
- System Firmware Update

## **ROM-Based Setup Utility**

ROM-Based Setup Utility (RBSU) performs a wide range of configuration activities, including the following:

- Configuring system devices and installed options
- Viewing system information
- Selecting the operating system
- Selecting the primary boot controller

In addition, RBSU includes other features, which are outlined in “Using RBSU” later in this chapter.

For information on RBSU not found in this guide, refer to the *ROM Based Setup Utility User Guide* found in your documentation pack.

## **Navigating RBSU**

To make selections within RBSU, use the following keys:

- To access RBSU, press the **F9** key when prompted during startup.
- The arrow keys navigate through the menu system.
- Selections are made by pressing the **Enter** key.
- Selections are cancelled by pressing the **Escape** key.
- Selections and changes are saved by pressing the **F10** key.

## Using RBSU

**NOTE:** Most of the features in RBSU are not required in the setup of this server. The options in this utility are designed to assist with specific server configuration issues.

RBSU is separated into a series of menu selections designed to configure specific areas of the system. The primary menus are as follows:

- System Options
- Standard Boot Order (IPL)
- PCI Devices
- Boot Controller Order
- Date and Time
- Automatic Server Recovery (ASR)
- Server Passwords
- Server Asset Text
- Advanced Options
- BIOS Serial Console/EMS Support
- Utility Language

**NOTE:** The RBSU main menu will identify interleaving memory mode in the information block displayed to the right of the menu options.

### System Options

The **System Options** menu configures the basic input/output (I/O) of the server and sets the operating system. The configuration options include the operating system, external ports, and controlling the diskette drive. The following is a list of selections found in this menu with an explanation of each option:

- **OS Selection** selects the primary operating system for the server. Default sever settings are automatically set based on the operating system selected.

- **Serial Number** allows the user to enter the serial number if the system board has been replaced.
- **Embedded COM Port X** sets the configuration for the internal serial port. The configuration options include the address and interrupt request (IRQ). This option can also disable the port.
- **Embedded NIC PXE Support** enables the Pre-boot Execution Environment (PXE) support for NIC Port 1. The **Embedded NIC Port PXE Support** option allows the server to boot to the network and attach to a PXE server with boot images. When enabled, the NIC port is displayed in the **Initial Program Loader (IPL)** list.
- **Integrated Diskette Controller** enables or disables the diskette drive. **Diskette Write Control** and **Diskette Boot Control** are irrelevant when the diskette drive is disabled.
- **Diskette Write Control** allows the user to configure the write control of the diskette drive. It can be set to read and write or to read only.
- **Diskette Boot Control** enables the user to have the system boot from the removable media device.
- **Embedded LPT Port** allows the user to enable the embedded LPT Port at the specified resource settings or disable the option.
- **NUMLOCK Power-On State** enables or disables the power-up state of the **NUMLOCK** key.

### **Standard Boot Order (IPL)**

The **Standard Boot Order (IPL)** menu option configures the Initial Program Loader (IPL) device. It controls the search order the server goes through to look for a bootable device.

### **PCI Devices**

The **PCI Devices** menu option displays and modifies the configuration of the PCI devices installed in the server. Information for each slot is displayed and the IRQs can be changed. Multiple PCI devices can share an interrupt.

## Boot Controller Order

The **Boot Controller Order** menu option is used to view and assign the current controller order.

## Date and Time

The **Date and Time** menu option is used to set the system date and time.

## Automatic Server Recovery

The **Automatic Server Recovery** menu configures the Automatic Server Recovery (ASR) features and may include the following options:

- **ASR Status** enables or disables ASR. When set to **Disabled**, no ASR features function.
- **ASR Timeout** sets a timeout limit for resetting a server that is not responding. When the server has not responded in the selected amount of time, it automatically resets.
- **Thermal Shutdown** enables or disables the ability of the server to automatically power down when it reaches a dangerous temperature.

## Server Passwords

The **Server Passwords** menu configures the password environment of the server. The available options are:

- **Set Admin Password** sets a password to control access to the administrative features of the server. When this password is set, the administrative features of the server cannot be accessed without the correct password being entered.
- **Set Power-On Password** sets a password to control access to the server during power up. When this password is set, the server cannot be powered up without the correct password being entered.

- **Network Server Mode** is a security feature that protects an unattended network server while allowing it to run after a power interruption. When set to **Disabled**, the server operates normally. When set to **Enabled**, the following actions occur:
  - The local keyboard does not function unless the power-on password is entered.
  - When there is not a diskette in the diskette drive, the power-on password is bypassed, allowing the server to start.
  - When there is a diskette in the diskette drive, the server does not start unless the power-on password is entered locally.

**NOTE:** Network Server Mode cannot be enabled until a power-on password has been established through the **Set Power-On Password** menu.

- **Quicklock** enables or disables the Quicklock feature. When set to **Enabled**, the keyboard is locked by pressing the **Ctrl+Alt+L** keys. The keyboard remains locked until the password is typed in.

**NOTE:** If the password is disabled at the power-on key prompt, the Quicklock password feature will remain active until the next time the system is turned on.

## **Server Asset Text**

The **Server Asset Text** menu customizes the system-specific text for the server, including the following:

- **Set Server Information Text** defines reference information for the server, such as **Server Name**, **Server Asset Tag**, **Server Primary OS**, and **Other Text**.
- **Set Administrator Information Text** defines reference information for the server administrator, such as **Admin Name Text**, **Admin Phone Number Text**, **Admin Pager Number Text**, and **Other Text**.
- **Set Service Contact Text** defines reference information for the service contact of the server, such as **Service Name Text**, **Service Phone Number Text**, **Service Pager Number Text**, and **Other Text**.
- **Serial Number** allows the user to change the chassis serial number.

## Advanced Options

The **Advanced Options** menu is used to configure advanced options of the system. The following is a list of selections found in this menu with an explanation of each option:

- **MPS (multi-processor settings) Table Mode** allows the user to change the advanced programmable interrupt controller (APIC) table setting. This selection should be automatically set by **OS Selection**, but it allows the user to override the automatic selection.

**NOTE:** The latest operating systems from Microsoft®, Novell, and SCO bypass the use of IRQs and use an APIC. The APIC has been designed to address the issues associated with limited IRQs, multiprocessor systems, and shared interrupts. If the user is utilizing the latest operating system, the user can let the system automatically configure interrupts for all devices in the system.

- **POST Speed Up** allows the user to enable or disable the quick or slow start process. The slow start process performs a complete memory test.
- **F1 Prompt** configures the server to require the user to press the **F1** key to proceed during power up when an error is encountered during the power-up sequence.
- **ROM Selection** toggles the server ROM between the current ROM and the backup ROM.
- **Erase Non-Volatile Memory** resets the non-volatile memory of the server to an initial, factory state. When **Yes** is selected, the non-volatile memory is erased and set to an initial, factory state.
- **Set CPU Corrected** is used to indicate that a previously failed processor has been corrected.
- **Wake-On LAN** allows the user to enable or disable **Wake Support (PME)**.
- **Secondary IDE Controller** allows the user to enable or disable the secondary IDE controller.
- **NMI Debug Button** allows the user to disable or enable the **NMI debug** button on the system board.

- **Processor Hyperthreading** allows the user to enable or disable the logical processor in an Intel Xeon processor with Hyper-Threading technology.
- **Custom POST Message** allows the user to input a message that can be viewed during POST.

## **BIOS Serial Console/EMS Support**

The **BIOS Serial Console** option allows the user to view POST error messages and run RBSU remotely through a serial connection to the server COM port. A keyboard and monitor are not required on the machine that is being remotely configured. For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide*.

## **Utility Language**

The **Utility Language** option is used to set the language in which RBSU is displayed.

## **Redundant ROM Support**

These servers enable the user to upgrade or configure the ROM safely with redundant ROM support. The server has a 2-MB ROM that acts as two separate 1-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains the backup version.

## **Safety and Security Benefits**

When the user flashes the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling the user to switch easily to the existing ROM version if the new ROM becomes corrupted for any reason. This feature protects the previous ROM version, even if the user experiences a power failure while flashing the ROM.

## **Access to Redundant ROM Settings**

Use ROMPaq utilities to create a backup ROM image before upgrading the configuration or to restore saved ROM data.

1. Access RBSU by pressing the **F9** key when prompted at start-up.
2. Select **ROM Selection** in the **Advanced Options** menu of RBSU.
3. Select one of the ROM banks as the system ROM.
4. Press the **Enter** key.
5. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.
6. Restart the server.

When the server boots, the system identifies whether the current ROM bank is corrupt. If a corrupt ROM is detected, the system boots from the backup ROM and alerts the user through POST that the ROM bank is corrupt.

Switching ROM images, in the event that RBSU is inaccessible, can be done by changing the switch settings on the system configuration switch. Refer to Appendix E, “LED Indicators, Switches and Jumpers” for additional information on this process.

## ROMPaq

Using flash ROM in HP servers allows the firmware (BIOS) to be upgraded with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive, remove power from the system, and then power up the system again.

**NOTE:** Refer to “SmartStart Diskette Builder” in this chapter for instructions on creating a ROMPaq diskette.

The ROMPaq utility then checks the system and provides a choice (if more than one exists) of ROM revisions to which the system can be upgraded. This procedure is the same for both system and option ROMPaq utilities.



**CAUTION:** Do not power down during a firmware upgrade. A loss of power during upgrade may corrupt the firmware and prevent the system from starting.

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## **SmartStart Software**

The SmartStart CD is used to load the system software, thereby achieving a well-integrated server and ensuring maximum dependability and supportability. The SmartStart CD contains diagnostic utilities and ROMPaq tools.

To install the SmartStart CD:

1. Press the **F9** key to run RBSU and configure the primary operating system.
2. Locate the SmartStart CD in the ProLiant Essentials Foundation pack.
3. After the user powers up the server, press the CD-ROM drive eject button.
4. Insert the SmartStart CD into the CD-ROM drive with the labeled side up. Handle the CD by its edges, not by the flat surfaces of the disc.
5. When the busy indicator turns green, the SmartStart sequence begins.
6. Refer to the SmartStart documentation included with the server to install the operating system, create updated driver diskettes, and run upgrade utilities.

## **SmartStart Diskette Builder**

The SmartStart CD contains a utility to generate support diskettes in the event that they are needed or the software cannot be used directly from the SmartStart CD. Support diskettes are punched-out from data stored on the SmartStart CD. The support diskettes include the following:

- Array Configuration Utility (ACU)
- Operating System support
- Server utilities
- Erase utility
- System and Option ROMPaq diskettes

To run the Diskette Builder, use a workstation running the Windows® 95, Windows 98, Windows XP, Windows NT, or Windows 2000 operating system. The user will also need several 1.44-MB diskettes. All data on the diskettes will be overwritten. Insert the SmartStart CD into the workstation drive. The CD automatically runs the Diskette Builder utility; however, if the system does not support the auto-run feature, use Windows Explorer to run *CD-ROM DRIVE:\DSKBLDR\DSKBLDR.EXE*.

## **Insight Manager**

Insight Manager is the HP application for easily managing network devices. Insight Manager delivers intelligent monitoring and alerting as well as visual control of your HP devices, and includes the following functions:

- Forwards server alerts and fault conditions
- Monitors fault conditions and server performance
- Controls server security and configuration
- Remotely controls server
- Initiates rapid recovery services

Documentation for Insight Manager is available on the Management CD. Insert the Management CD and accept the License Agreement. From the left sidebar, select **Insight Manager 7**, then click **Documentation** in the right frame. A list of Insight Manager 7 documentation will display.

**IMPORTANT:** The user must install and use Insight Manager to benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules.

## **Survey Utility**

Survey Utility is an online information-gathering agent for Microsoft Windows, Novell NetWare, and Linux operating systems that collects critical hardware and software information from various sources. If a significant change occurs between data-gathering intervals, the previous information is marked, and the data file is appended to reflect the latest configuration and changes. This file allows the user to keep a historical record of change events for server hardware and software.

Survey Utility automatically runs at startup and on specified time intervals. The user can modify the data-gathering interval by modifying the command-line parameters.

For more information on Survey Utility, including installation and application procedures, refer to the *Survey Utility Online Help User Guide* accessed through the HP website:

[www.hp.com/servers/proliant/manage/](http://www.hp.com/servers/proliant/manage/)

Perform a search for “Survey Utility,” and then follow the appropriate link.

## **Diagnostics Utility**

The Diagnostics utility tests the operation of your HP hardware and isolates failed parts, whenever possible. Diagnostic error codes are generated when the Diagnostics utility recognizes a problem. These error codes help identify defective components. A Diagnostics diskette can be made by running the Server Diagnostics file available for download from the following website:

[www.hp.com/servers/proliant/manage/](http://www.hp.com/servers/proliant/manage/)

## Automatic Server Recovery

Automatic Server Recovery (ASR) is a feature of ProLiant servers that resets the system in the event of a catastrophic operating system error like a blue-screen, ABEND (abnormal end), or panic. A system failsafe timer, the ASR timer, is started when the System Management driver, also known as the health driver, is loaded. The timer is reset periodically during normal operation, but in the event of operating system failure, the timer expires and restarts the server. ASR increases server up time by restarting the server within a predetermined amount of time after the system stops responding. The Insight Manager console notifies the user in the event of an ASR restart. The user can disable ASR from the Insight Manager console.

**IMPORTANT:** Insight Manager must be installed for ASR to function.

## Power-On Self-Test

Power-On Self-Test (POST) is a series of diagnostic tests that checks firmware and assemblies to ensure that the system is functioning properly. This utility runs automatically every time the server is powered up.

Refer to Appendix D, “Troubleshooting,” for the normal power-up sequence and diagnosis of problems encountered during POST.

## System Firmware Update

Smart Components for System Firmware Update enables Microsoft Windows NT 4.0 and Windows 2000 to efficiently upgrade and manage system and array controller ROMs. This tool includes the following features:

- Works offline and online
- Integrates with other HP software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

# A

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## Regulatory Compliance Notices

### Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique HP series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this series number. The series number should not be confused with the marketing name or model number of the product.

## **Federal Communications Commission Notice**

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (personal computers, for example). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The rating label on the device shows which class (A or B) the equipment falls into. Class A devices do not have an FCC logo or FCC ID on the label. Class B devices have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

## **Class A Equipment**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

## **Class B Equipment**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

## **Declaration of Conformity for Products Marked with the FCC Logo—United States Only**

This device complies with Part 15 of the FCC Rules Operation and is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact:

Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 530113  
Houston, Texas 77269-2000

or call 1-800-652-6672. For continuous quality improvement, calls may be recorded or monitored.

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 510101  
Houston, Texas 77269-2000

or call 281-514-3333.

To identify this product, refer to the Part, Series, or Model number found on the product.

## **Modifications**

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

## **Cables**

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

## **Mouse Compliance Statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## **Canadian Notice (Avis Canadian)**

### **Class A Equipment**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### **Class B Equipment**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## **European Union Notice**



Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN60950 (IEC60950) – Product Safety

## **Japanese Notice**

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## **BSMI Notice**

**警告使用者：**

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Battery Replacement Notice

This server is provided with a lithium manganese dioxide battery. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Unless specific replacement instructions are provided as part of this guide, replacement is to be done by an authorized service provider using the spare designated for this product. For more information about battery replacement or proper disposal, contact an HP authorized reseller or authorized service provider.



**WARNING:** The server contains an internal lithium manganese dioxide battery. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60°C.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the HP spare designated for this product.



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, use the public collection system or return them to HP, your HP authorized service resellers or providers, or their agents.

## Laser Compliance

The CD-ROM drive contains a laser diode of gallium aluminum arsenide (GaAlAs) emitting in the wavelength range of  $780 \pm 35$  nm. All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous laser radiation.



**WARNING:** Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

- Do not try to open the unit enclosure. There are no user-serviceable components inside.
- Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
- Allow only HP authorized service providers to repair the unit.

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.



This marking on the internal CD-ROM drive indicates that the product is classified as a CLASS 1 LASER PRODUCT.

## **Power Cords**

If you were not provided with a power cord for the server, you should purchase a power cord that is approved for use in your country.

The power cord must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm<sup>2</sup> or 18 AWG, and the length of the cord must be between 1.8 m (6 ft) and 3.6 m (12 ft). If you have questions about the type of power cord to use, contact your HP authorized service provider.

A power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

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## **Electrostatic Discharge**

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. An electrostatic discharge (ESD) from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

### **Preventing Electrostatic Discharge**

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded (earthed) surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

## Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded (earthed) workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megaohm  $\pm$  10 percent resistance in the ground cords. To provide proper grounding, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP authorized reseller install the part.

**NOTE:** For more information on static electricity, or assistance with product installation, contact your HP authorized reseller.

# C

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## Server Error Messages

The following POST error message is new and unique to some HP ProLiant servers:

A processor thermal event occurred prior to this power up, Processor X

This message indicates that processor X (1 or 2) has reached an excessive temperature and has stopped operation. Verify the following information:

- The processor and heatsink assembly is properly installed.
- Ambient temperature is within an acceptable range.
  - Refer to Appendix F, “Specifications,” for operational temperature requirements.

For a complete listing of error messages provided for the server, refer to the *Servers Troubleshooting Guide* in your user documentation.

# D

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## Troubleshooting

This appendix provides specific troubleshooting information for the HP ProLiant ML350 Generation 3 server and is to be used to find details about server startup and installation problems.

See Appendix E, “LED Indicators, Switches, and Jumpers,” for information on LEDs, switch settings, and jumpers.

For information about general troubleshooting techniques, diagnostic tools, error messages, and preventative maintenance, refer to the *Servers Troubleshooting Guide*, included in your user documentation.

This appendix includes the following topics:

- When the Server Does Not Start

You are provided with step-by-step instructions on what to try and where to go for help for the most common problems encountered during the initial Power-On Self-Test (POST). A successful startup requires the server to complete this test each time you power up, before the server can load the operating system and start running software applications.

- Problems After Initial Startup

After the server has passed the POST, you may still encounter errors, such as an inability to load your operating system. You are provided with instructions on what to try and where to go for help when you encounter errors after the server completes the POST.

- Other Information Resources

This section provides a list of reference information available for the server.

For troubleshooting information on this server that is beyond the scope of this guide, both general and specific, refer to “Other Information Resources” later in this appendix.

## When the Server Does Not Start

This section provides step-by-step instructions on what to try and where to go for help with the most common problems encountered during the initial Power-On Self-Test (POST). During every power up, POST must be completed before the server can load the operating system and start running software applications.

If the server completes POST and attempts to load the operating system, refer to “Problems After Initial Startup” later in this appendix.



**WARNING: There is a risk of personal injury from hazardous energy levels. The installation of options and the routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.**

When the server does not start:

1. Be sure that the server and monitor are plugged into a working outlet.
2. Be sure that your power source is working properly:
  - a. Check the status using the Power On/Standy LED. Refer to “System Status LEDs” in Appendix E for the location of the Power On/Standy LED.
  - b. Be sure that the Power On/Standy switch was pressed firmly.
3. Refer to the “Power Source” section in the *Servers Troubleshooting Guide* for details on what else to check.
4. If the system does not complete the Power-On Self-Test (POST) or start loading an operating system, refer to the “General Loose Connections” section in the *Servers Troubleshooting Guide*.

**NOTE:** If the server is rebooting repeatedly, be sure that the system is not restarting due to an Automatic Server Recovery (ASR) power-up caused by another problem. Check Insight Manager for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.

5. Restart the server.

6. Check for the following “normal power up sequence” to be sure that your system meets the minimal hardware requirements and is powered up under normal operation:
  - a. The front panel Power On/Standy LED turns green.
  - b. The fans start up.
  - c. The server ROM initializes the server in the following sequence:
    - Video initialization—The HP initialization screen is displayed.
    - Processor initialization
    - Memory test
    - Memory initialization
    - Diskette drive
    - SCSI devices (if applicable)
    - ATA devices (if applicable)
    - Option ROM
  - d. The operating system loads to complete the boot process.

If the problem persists, continue with the following section, “Diagnosis Steps.”

## Diagnosis Steps

If the server does not power up, or powers up but does not complete the Power-On Self-Test (POST), answer the questions in Table D-1 to determine appropriate actions based on the symptoms observed. According to the answers you give, you will be directed to the appropriate table in the section that immediately follows. That table outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions, and references to other sources of information.

**Table D-1: Diagnosis Steps**

Question	The Next Step
Question 1: Is the front panel Power-On/Standby LED on? (solid green)	If no, go to Table D-2. If yes, continue to Question 2.
Question 2: Can you see anything on your monitor?	If no, go to Table D-3. If yes, video is available for diagnosis. Determine next action by observing POST progress and error messages. Refer to the <i>Servers Troubleshooting Guide</i> for a complete description of each POST error message.

**NOTE:** If the server attempts to load the operating system, go to “Problems After Initial Startup” later in this appendix.

**Table D-2: Front Panel Power-On/Standy LED Is Not On**

Refer to “LEDs” in Appendix E for a complete description of system status LEDs

Possible Reason	The Next Step
	To reduce the risk of electric shock or damage to the equipment, before opening access panels to reseat components, power down the server and disconnect the power cord.
There is no AC power connection.	1. Check the power cables. Be sure that they are fully connected. Check to be sure the power supply LED is illuminated on the rear of the power supply unit. If no LED, remove power cable and remove and reinstall the power supply unit.
Power button was not firmly pressed.	2. Press the power button.
Power button connector cable is not properly connected to the system board.	3. Check the power source.
Processor has failed or is not properly seated.	4. Refer to “Power Problems” in the <i>Servers Troubleshooting Guide</i> for further options.
Power supply has failed or is not connected.	5. Reconnect the power button cable to the system board.
No PPM	6. Refer to section “System Board Components” in Chapter 1, “Server Features,” for the location of the power button connector.

*continued*

**Table D-2: Front Panel Power-On/Standy LED Is Not On *continued***

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**Refer to “LEDs” in Appendix E for a complete description of system status LEDs**

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7. Follow the power-down procedures for the server. Reseat all expansion boards, and verify that all cables are securely connected.
8. Refer to Chapter 3, “Hardware Options Installation,” for complete instructions.
9. Refer to “General Hardware Problems” in the *Servers Troubleshooting Guide* for tips on proper procedures.
10. Check the diagnostic LEDs on the system board. Refer to Appendix E, “LED Indicators, Switches, and Jumpers” for additional information.
11. If these steps do not correct the problem, the most likely cause lies either in the power supply subsystem or the processor. Contact your HP authorized service provider for further technical support.

Refer to the *Servers Troubleshooting Guide* for a list of HP authorized service providers.

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**Table D-3: Server Does Not Have Video**

**WARNING: To reduce the risk of electric shock or damage to the equipment, before opening access panels to reseat components, power down the server and disconnect the power cord.**

Possible Reasons	The Next Step
If an optional video card was installed, the monitor cable may not be correctly connected.  The monitor may not be properly connected.	<ol style="list-style-type: none"><li>1. Be sure that the monitor has power and that the monitor cable is securely connected. If more than one video adapter is installed, be sure that the monitor is connected to the correct video card.</li><li>2. Be sure that the monitor is functional by connecting it to a known working server.</li><li>3. Power down the server. Reseat all cards and memory modules, and verify all cable connections.</li><li>4. Refer to Chapter 3 for bezel and side panel removal.</li><li>5. Restart the server.</li><li>6. Listen for audible indicators, such as a series of beeps. A series of beeps indicates the presence of a Power-On Self-Test (POST) error message.</li></ol> <p>Refer to the <i>Servers Troubleshooting Guide</i> for a complete listing of possible POST error messages.</p>
	<i>continued</i>

**Table D-3: Server Does Not Have Video *continued***

Possible Reasons	The Next Step
	<p>7. Analyze any system board amber LEDs. Refer to Appendix E, "LED Indicators, Switches, and Jumpers," for additional information.</p> <p>8. Refer to "Video Problems" in the <i>Servers Troubleshooting Guide</i>.</p> <p>If these steps do not correct the problem, contact your HP authorized service provider for further technical support.</p>

## Problems After Initial Startup

After the server has passed the Power-On Self-Test (POST), you may still encounter errors, such as an inability to load your operating system. Use Table D-4 to troubleshoot server installation problems that occur after the initial startup.

For updated information on supported operating systems, log on to the Internet at  
[www.hp.com/servers/proliant/](http://www.hp.com/servers/proliant/)

**NOTE:** If the server is rebooting repeatedly, be sure that the system is not restarting due to an Automatic Server Recovery (ASR) power up caused by another problem. Check Insight Manager for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.

Refer to the *Servers Troubleshooting Guide* for the following:

- Information you need to collect when diagnosing software problems and to provide when contacting support
- Instructions on how to upgrade the operating system and its drivers
- Information on available recovery options and advice on minimizing downtime

**Table D-4: Problems After Initial Startup**

<b>Problem</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
System cannot load SmartStart utility.	Wrong version of SmartStart is being installed.	<ol style="list-style-type: none"> <li>1. Check the SmartStart release notes and user documentation.</li> <li>2. Refer to the HP website to be sure you have the correct version of SmartStart</li> </ol>
The CD-ROM/diskette drive assembly is not set as a bootable device.	<p>The CD-ROM/diskette drive assembly is not set as a bootable device.</p> <p>Refer to Chapter 5, "Server Configuration and Utilities," or the <i>ROM Based Setup Utility User Guide</i> on the server documentation CD for complete instructions on the use of RBSU.</p>	<ol style="list-style-type: none"> <li>1. Press the <b>F9</b> key to run the ROM Based Setup Utility (RBSU) when prompted.</li> <li>2. Set defaults and exit the utility.</li> <li>3. Rerun RBSU to verify the system configuration.</li> </ol>
The CD-ROM/diskette drive assembly is either not installed, or is not properly connected.	<p>The CD-ROM/diskette drive assembly is either not installed, or is not properly connected.</p> <p>Refer to the <i>HP ProLiant ML350 Generation 3 Server Maintenance and Service Guide</i> for connection information.</p> <p>If the cable is not the problem, refer to "CD-ROM Problems" in the <i>Servers Troubleshooting Guide</i>.</p>	<ol style="list-style-type: none"> <li>1. Power down the server.</li> <li>2. Be sure that the CD-ROM/diskette drive assembly is installed.</li> <li>3. Remove and reseat the CD-ROM/diskette drive assembly.</li> <li>4. Be sure the cable between the backplane and the CD-ROM/diskette drive assembly has a proper connection.</li> </ol>

*continued*

**Table D-4: Problems After Initial Startup** *continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
<i>Continued System cannot load SmartStart utility.</i>	Diskette in CD-ROM/diskette drive assembly is preventing the system from loading.	Remove the diskette.
SmartStart utility fails during installation.	Operating system has not been selected.	<ol style="list-style-type: none"> <li>1. Press the <b>F9</b> key to run the ROM Based Setup Utility (RBSU) when prompted.</li> <li>2. Select the primary operating system.</li> </ol> <p>Refer to Chapter 5, “Server Configuration and Utilities,” or the <i>ROM Based Setup Utility User Guide</i> for complete instructions on the use of the setup utilities.</p>
Error occurs during installation.		<p>Follow the error information provided. If it is necessary to reinstall, first run the System Erase Utility.</p> <p>Refer to the <i>Servers Troubleshooting Guide</i>.</p>



**CAUTION:** The System Erase Utility causes the loss of all configuration information, as well as loss of existing data on all connected hard drives. Read “System Erase Utility” and the associated cautionary statements in the *Servers Troubleshooting Guide* before performing this operation.

*continued*

**Table D-4: Problems After Initial Startup** *continued*

<b>Problem</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
Server cannot load operating system.	Required operating system step was missed.	<ol style="list-style-type: none"> <li>1. Note at which phase the operating system failed.</li> <li>2. Remove any loaded operating system components.</li> <li>3. Refer to your operating system documentation.</li> <li>4. Reinitiate installation procedures.</li> </ol>
	Installation problem occurred.	Refer to your operating system documentation and to the SmartStart release notes.
	Primary hard drive controller installation is incorrect.	Run RBSU by pressing the <b>F9</b> key to correct this problem.
	Hard drive controller order is incorrect.	Run RBSU by pressing the <b>F9</b> key to correct this problem.
	Encountered problem after new hardware was added to the system.	<p>Refer to the documentation provided with the hardware. Remove the new hardware.</p>
	Problem was encountered with hardware added to a new system ordered with a factory-installed operating system (where available).	<p>You must complete the factory-installed operating system software installation <b>before</b> adding new hardware to the system. Be sure that you are following the instructions provided in the <i>Factory-Installed Operating System Software Installation Guide</i>.</p>

**Note:** Refer to Chapter 5, “Server Configuration and Utilities,” or the *ROM Based Setup Utility User Guide* for complete instructions on the use of RBSU.

## Other Information Resources

Refer to the following table for additional help.

**Table D-5: ProLiant ML350 Generation 3 Server Troubleshooting Resources**

Resource	What it is
<i>Servers Troubleshooting Guide</i>	This is a resource for obtaining troubleshooting information that is beyond the scope of this document. It includes general hardware and software troubleshooting information for all HP ProLiant servers, a complete list of error messages along with an explanation of probable cause, and a list of appropriate measures. This guide ships with the server.
<i>HP ProLiant ML350 Generation 3 Server Maintenance and Service Guide</i>	This resource provides a complete list of all replacement parts available, along with step-by-step instructions on installation and replacement. Find this guide on the HP website at <a href="http://www.hp.com/servers/proliant">www.hp.com/servers/proliant</a> .  Follow the link for maintenance and service guides, and download the guide provided for the server.

You can access information on warranties and service and support upgrades (CarePaq services) by logging on to the Internet at

[www.hp.com](http://www.hp.com)

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## LED Indicators, Switches, and Jumpers

This appendix describes the following features of the HP ProLiant ML350 Generation 3 server:

- LEDs

There are several LEDs located on the front, back, and inside of the server. These LEDs can communicate the current status of the server components and operations, thus aiding you in diagnosing the problem. An illustration of the location of each LED on the server, as well as an explanation of uses and possible statuses is provided in the following section.

- Switches

There are two switchbanks in the server. Some switch settings may need to be changed from time to time and can cause problems if they are not correctly set. Some switches should not be changed for any reason. A list of all switches, a description of what each setting means and an illustration of where each may be found inside the server is provided in this section.

- Jumpers

When devices are added to the server, the jumpers on the device may need to be changed. Information on jumper settings is provided in this section.

For additional troubleshooting information on this server that is beyond the scope of this guide, both general and specific, refer to “Other Information Resources” in Appendix D, “Troubleshooting.”

## LEDs

A variety of status LEDs are located on the front and back of this server. These LEDs aid you in diagnosing problems by communicating the status of the components and operations of the server. The following server LEDs are explained in this appendix.

- System status LEDs (on the front of the server)
  - Power On/Standby and AC power status
  - Network Interface Controller (NIC) activity
  - External health
  - Internal health
  - Unit ID
- System board LEDs
  - Processor failure
  - Processor over heating
  - PPM failure
  - Memory failure
  - System Thermal failure
  - Fan failure
  - PCI-X bus speed
- Network controller LEDs (on the back of the server)
  - Network activity status
  - Network link
  - Connection speed

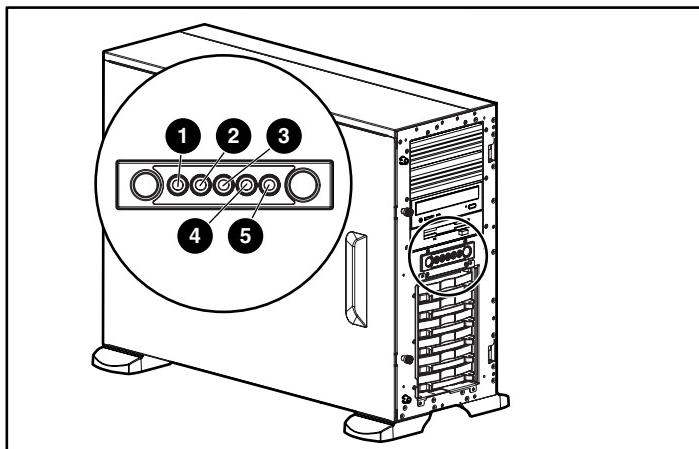
## **System Status LEDs**

The system status LEDs and the Power On/Standy button are located on the front of the server.

The Power On/Standy button allows you to:

- Power up the server.
- Place the server in standby mode.
- Power down the server.

Figure E-1 and Table E-1 explains each possible LED status.



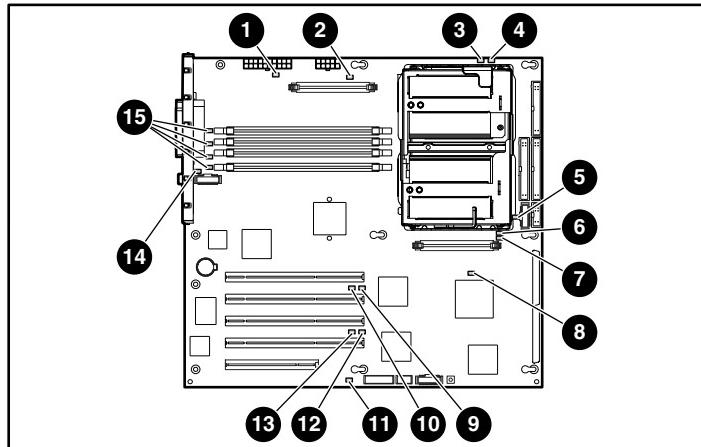
**Figure E-1: System status LEDs**

**Table E-1: System Status LEDs**

Item	Description	Status	Means
1	Unit ID indicator	Off	System off
		Blue	Identification
		Flashing blue	Remote console
2	Internal health	Off	System off
		Green	System on, AC power available
		Amber	System degraded
		Red	System critical
3	External health	Off	System off
		Green	System on, AC power available
		Amber	System degraded (most commonly due to redundant power supply failure)
		Red	Power supply failed
4	NIC indicator	Off	No connection
		Green	Linked to network
		Flashing green	System is in standby
5	Power On/Standby status indicator	Off	System off, no AC power
		Green	System on, AC power available. Do not remove power from system.
		Amber	System off, AC power available

## System Board LEDs

The following LEDs are located on the system board of the server and indicate when a processor, PPM, or memory module has experienced a failure.



**Figure E-2: System board LEDs**

**Table E-2: System Board LEDs**

Item	LED Description	Status
1	AC power	Off = No AC power or poor power supply. Green = Power supply is turned on and functioning
2	PPM 1 status	Off = PPM 1 functioning Amber = PPM 1 failed

*continued*

**Table E-2: System Board LEDs** *continued*

Item	LED Description	Status
3	Processor 1 thermal	Off = Normal Amber = Thermal trip detected for processor 1. Refer to Appendix C, "Server Error Messages," for appropriate instructions.
4	Processor 1 status	Off = Processor 1 functioning Amber = Processor 1 failed
5	I/O Fan status	Off = Fan is functioning Amber = Fan is not installed or has failed
6	Processor 2 status	Off = Processor 2 functioning Amber = Processor 2 failed
7	Processor 2 thermal	Off = Normal Amber = Thermal trip detected for processor 2. Refer to Appendix C, "Server Error Messages," for appropriate instructions.
8	PPM 2 status	Off = PPM 2 functioning Amber = PPM 2 failed
9	PCI-X bus 2 speed	Off = PCI 33 MHz/PCI-X 66 MHz operating mode On = PCI 66 MHz/PCI-X 100 MHz operating mode
10	PCI-X bus 2 mode	Off = PCI-X mode inactive On = PCI-X mode active
11	Temperature threshold	Off = Normal Amber = System temperature threshold exceeded
12	PCI-X bus 5 speed	Off = PCI 33 MHz/PCI-X 66 MHz operating mode On = PCI 66 MHz/PCI-X 100 MHz operating mode

*continued*

**Table E-2: System Board LEDs** *continued*

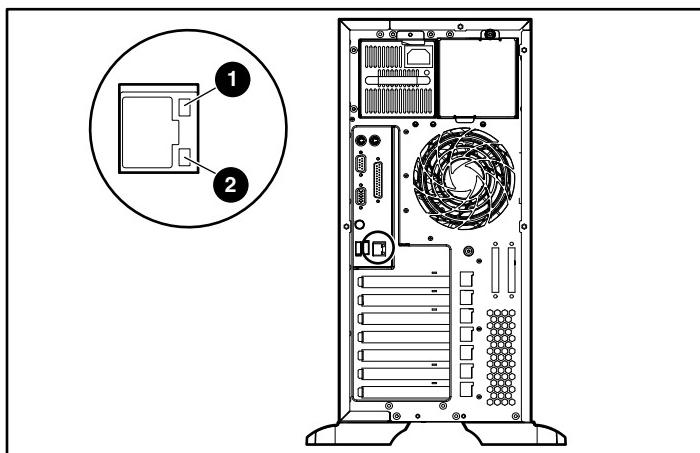
Item	LED Description	Status
13	PCI-X bus 5 mode	Off = PCI-X mode inactive On = PCI-X mode active
14	CPU Fan status	Off = Fan is functioning Amber = Fan is not installed or has failed
15	DIMM status (DIMM slots 1 through 4)	Off = DIMM functioning Amber = DIMM failed

## Network Controller LEDs

The network controller LEDs are located on the back of the server. They provide the following information:

- If the server is linked to the network
- If there is current network activity

Refer to the *Servers Troubleshooting Guide* for more information on troubleshooting network controller problems.



**Figure E-3: Network controller LEDs**

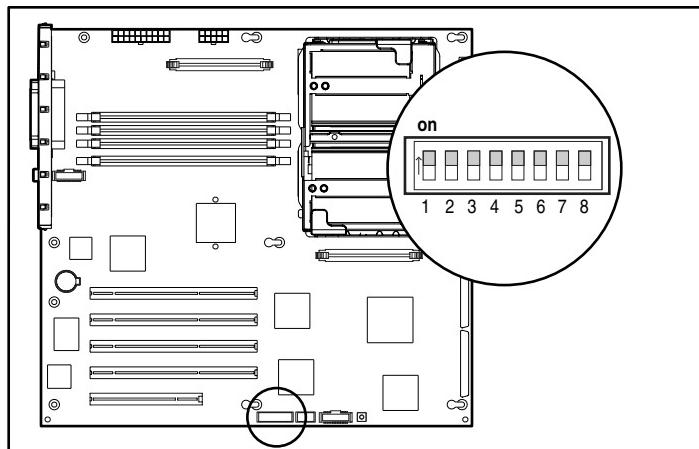
**Table E-3: Network Controller LEDs**

Item	LED	Status	Means
1	Activity	Off	No network activity
		Green Blinking	Linked and activity on the network
2	Link	Off	No network link
		Green	Linked to network

## System Configuration Switch Settings

Some server operations, which may include adding or removing a component, changing a security feature, or reconfiguring the server from tower to rack, require that you reconfigure a system switch. If the system configuration is incorrect, the server may not work properly and you may receive error messages on the screen.

The server system board contains two switchbanks, as well as a Non-Maskable Interrupt (NMI) switch. This section explains the use of each reserved and non-reserved switch and appropriate use of the NMI switch.



**Figure E-4: System configuration switch**

**Table E-4: System Configuration Switch Settings**

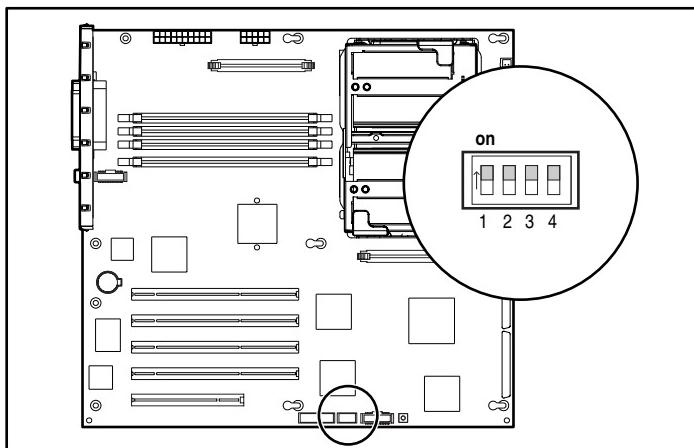
Position	Default	Function/Description
1*	Off	Reserved
2	Off	Lock configuration
3	Off	Tower/Rack configuration
4	Off	Enable diskette boot

*continued*

**Table E-4: System Configuration Switch Settings** *continued*

Position	Default	Function/Description
5	Off	Password disable
6	Off	Clear CMOS/NVRAM
7*	Off	Reserved
8*	Off	Reserved

\*Switch positions 1, 7 and 8 are reserved for HP authorized service providers only. Do not change the specified default setting for these positions, unless instructed otherwise.

**Figure E-5: System ID switch****Table E-5: System ID Switch Settings**

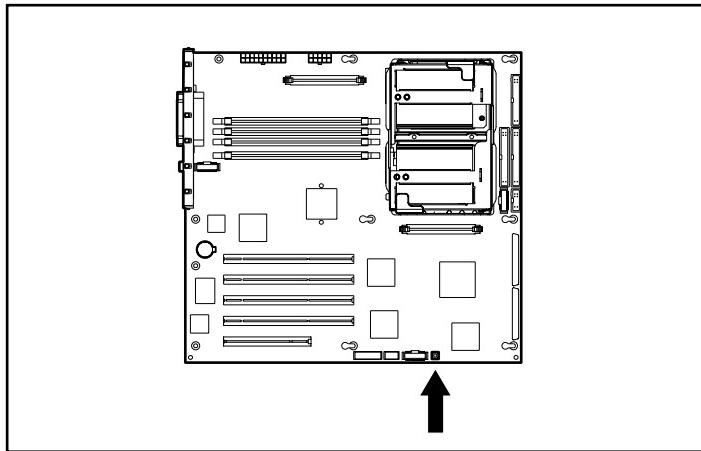
Position	Default	Function/Description
1	Off	Reserved
2	Off	Reserved
3	Off	Reserved
4	Off	Reserved

## Non-Maskable Interrupt Switch (NMI)

Crash dump analysis is an essential part of determining the cause of problems such as hangs or crashes in operating systems, device drivers, and applications. Many crashes freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

When an operating system crashes, system administrators can perform a non-maskable interrupt (NMI) event by pressing a dump switch. The NMI event enables a hung system to once again become responsive enough to provide debug information.

The NMI switch is used ONLY in the event of a service emergency that requires a complete data dump in preparation for recovering the system from a catastrophic event. Refer to Figure E-6 for location of the NMI switch.



**Figure E-6: Non-Maskable Interrupt switch**

## Resetting System Configuration Settings

It may be necessary at some time to clear and reset system configuration settings. When the system configuration switch position 6 is set to the **on** position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM. To reset the system configuration settings:

**IMPORTANT:** Clearing nonvolatile RAM (NVRAM) deletes your configuration information. Refer to Chapter 5 for complete instructions on configuring the server.

1. Power down the server.
2. Set the system configuration switch position 6 to the **on** position.
3. Power up the server.

All configuration settings are now erased and all system operations halt.

4. Power down the server.
5. Reset the position 6 switch to the default **off** position.
6. Power up the server.
7. Reset all system configuration settings.

Refer to Chapter 5, “Server Configuration and Utilities,” or the *ROM-Based Setup Utility User Guide* found on the server documentation CD, for more information on RBSU.

## **Redundant ROM Settings**

**IMPORTANT:** Switching ROM images can also be done through RBSU. Use the following procedures when RBSU is inaccessible. For information on accessing redundant ROM options through RBSU, refer to Chapter 5, “Server Configuration and Utilities.”

To switch from the current ROM to the backup ROM, perform the following steps:

1. Power down the server.
2. Set the system configuration switch positions 1, 5, and 6 to the **on** position.
3. Power up the server. The ROM will beep and halt when the ROM images have been swapped.
4. Power down the server and reset all system configuration switch positions to the default **off** position.
5. Power up the server.

## **SCSI Device Jumper Settings**

No two SCSI devices connected to the same SCSI controller can have the same SCSI ID. If another SCSI device is connected to the same controller, check the SCSI ID on the device before beginning the installation procedure for the additional device. The SCSI ID is set by jumpers located on each device. For more information, refer to your SCSI device option documentation.

# F

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## Specifications

This chapter provides detailed, specific information for the operation of your HP ProLiant ML350 Generation 3 server, including:

- Server specifications for both rack and tower models
  - Dimensions
  - Power requirements
  - Temperature requirements
- Minimum hardware configuration
- Supported operating systems
- Drivers

# Server Specifications

**Table F-1: Tower Server Specifications**

Feature	English Units	Metric Units
<b>Dimensions</b>		
Height (without feet)	17.5 in	44.50 cm
Height (with feet)	18.5 in	46.99 cm
Depth (without bezel)	24 in	60.96 cm
Depth (with bezel)	26.5 in	67.31 cm
Width (without feet)	8.5 in	21.59 cm
Width (with feet)	10.25 in	26.04 cm
Weight (no drives installed)	60 lb	27.24 kg
<b>Input requirements</b>		
Rated input voltage	100 VAC to 120 VAC	200 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Rated input current	7.4 A	3.7 A
Rated input power	538 W	538 W
BTUs per hour	1839	1839
<b>Power supply output</b>		
Rated steady-state power	500 W	500 W
<b>Temperature range</b>		
Operating	50°F to 95°F	10°C to 35°C
Shipping	-4°F to 140°F	-30°C to 60°C

*continued*

**Table F-1: Tower Server Specifications *continued***

Feature	English Units	Metric Units
<b>Relative humidity (noncondensing)</b>		
Operating	20% to 80%	20% to 80%
Nonoperating	5% to 95%	5% to 95%

## Rack Server

**Table F-2: Rack Server Specifications**

Feature	English Units	Metric Units
<b>Dimensions</b>		
Height	8.61 in	21.87 cm
Depth	24 in	60.96 cm
Width	19.0 in	48.26 cm
Weight (no drives installed)	60 lb	27.24 kg
<b>Input requirements</b>		
Rated input voltage	100 VAC to 120 VAC	200 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz	50 Hz to 60 Hz
Rated input current	7.4 A	3.7 A
Rated input power	538 W	538 W
BTUs per hour	1839	1839
<b>Power supply output power</b>		
Rated steady-state power	500 W	500 W
<b>Temperature range</b>		
Operating	50°F to 95°F	10°C to 35°C
Shipping	-4°F to 140°F	-30°C to 60°C
<b>Relative humidity (noncondensing)</b>		
Operating	20% to 80%	20% to 80%
Nonoperating	5% to 95%	5% to 95%

## Minimum Hardware Configuration

Make sure that the server meets the requirements for minimum hardware configuration. During the troubleshooting process, it may be necessary to reduce your system to its minimum configuration, reinstalling options one at a time to determine the cause of failure.

**Table F-3: Minimum Hardware Configuration**

Component	Minimum Specification
Processors	A processor must be installed in processor socket 1.
Fans	The I/O and CPU fans must be installed and connected to the system board.
Memory	At least one slot must be populated with an ECC 200-MHz Registered DDR DRAM DIMM.
PPM	A PPM must be inserted into the PPM slot 1.

For more information on minimum hardware configuration, refer to the *HP ProLiant ML350 Generation 3 Server Maintenance and Service Guide* at [www.hp.com/servers/proliant](http://www.hp.com/servers/proliant).

## Supported Operating Systems

To operate properly, the server must have a supported operating system.



**CAUTION:** If the server has a factory-installed operating system, configure the server using the instructions in the *Factory-Installed Operating System Software Installation Guide* or data will be lost.

---

For updated information on supported operating systems for this server, log on to the Internet at the following website:

[www.hp.com/servers/proliant](http://www.hp.com/servers/proliant)

or download a spreadsheet of supported operating systems for HP servers at the following ftp site:

<ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf>

For the latest information on Linux version and support, log on to the Internet at the following website:

[www.compaq.com/products/servers/linux.html](http://www.compaq.com/products/servers/linux.html)

## Drivers

The server features new hardware that does not have driver support on all operating system installation media. It is recommended that you use SmartStart and its Assisted Path feature to install your operating system and the latest driver support. If you do not use SmartStart to install your operating system, drivers for some of the new hardware must be downloaded and installed. These drivers, as well as other options drivers, ROM images, and value-add software can be downloaded from the following website:

[www.hp.com/servers/proliant](http://www.hp.com/servers/proliant)

For more information on drivers, refer to “Maintaining Current Drivers” in the *Servers Troubleshooting Guide*.

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# Index

## A

access panel  
    (rack), removing 3-7  
    tower, removing 3-6  
access panel (tower)  
    replacing 3-6  
ACU (Array Configuration Utility), diskette  
    builder 5-10  
adapter, SCSI devices 4-6  
additional items for installation 2-11  
administrator information text, setting 5-6  
administrator password 5-5  
APIC (advanced programmable interrupt  
    controller), settings 5-7  
arm, cable management *See* cable  
    management arm  
Array Configuration Utility *See* ACU  
ASR (Automatic Server Recovery)  
    server features 1-16  
    settings 5-5  
ATA devices 4-12  
ATAPI devices 4-12  
audible warnings D-8  
authorized reseller xiii  
available recovery options, additional  
    information D-10

## B

backup data, server installation 2-31  
baffle (fan), removing 3-27  
batteries  
    dangers A-8  
    disposal methods A-8  
    information 3-47  
    recharging A-8  
    replacement information A-8  
    replacement notice A-8  
    replacing 3-47  
beeps *See* POST  
bezel  
    opening 3-4  
    removing 3-4  
    replacing 3-5  
BIOS *See* ROM  
BIOS Serial Console, description 5-8  
boot order  
    controllers, configuring 5-5  
    devices, configuring 5-4  
booting remotely, PXE 1-14  
brackets, cable management arm 2-7, 2-16  
button, Power On/Standby, rack  
    models 2-29

## C

- cable management arm
  - identifying 2-7
  - installing 2-25, 2-26
  - moving for service 2-28
- cable management arm bracket
  - described 2-16
  - identifying 2-7
  - installing 2-16
- cable management arm mounting bracket, using 2-26
- cables
  - connecting 2-27
  - routing 2-27
- cabling
  - external SCSI controller 4-11
  - FCC Rules and Regulations A-4
  - guidelines 4-1
  - IDE devices to IDE controller 4-12
  - instructions 4-7, 4-10
  - SCSI controller to removable media or other device 4-7
  - server 4-1
  - SmartArray Controller 4-8
- cage nuts
  - identifying 2-7
  - installing 2-18, 2-22
- Canadian Notice A-5
- CarePaq D-14
- cautions
  - component rails 2-24
  - System Erase Utility D-12
  - third-party racks 2-11
  - UPS, protecting server 2-6
- CD-ROM drive
  - troubleshooting D-11
  - troubleshooting, additional information D-11
- CDs
  - Management 5-11
  - Rack Builder Configuration 2-3
- Rack Information Library 2-3
- Rack Optimization 2-3
- Rack Products Documentation 2-3
- Rack Resource CD Kit 2-3
- SmartStart 5-10
- chassis components
  - illustrated 3-2
  - rack-mountable-specific, installing 2-12
- clearance requirements, rack 2-10
- CMOS, clearing E-12
- COM Port, settings 5-4
- component rails
  - caution 2-24
  - described 2-14
  - installing 2-15
  - removing from slide 2-14
- components, reseating, warning D-8
- configuration
  - backing up 2-31
  - server 5-1
  - setup utility 2-33
  - tools 1-16
- configuration switch, rack 2-13
- configure-to-order systems *See*
  - factory-installed operating system
- connecting
  - hard drive to SmartArray Controller 4-8
  - IDE devices to IDE controller 4-12
  - SCSI controller to removable media or other device 4-7
  - system fan 4-13
- controllers
  - boot order 5-5
  - secondary IDE, disabling 5-7
- custom POST message, setting 5-8

## D

- data backup 3-3
- data backup, server installation 2-31
- date and time, setting 5-5
- diagnosing problems *See* troubleshooting

Diagnostics Utility  
overview 5-12  
server features 1-16  
website 5-12

DIMMs (dual inline memory modules)  
guidelines 3-28  
installation 3-32  
removing 3-33

disk controller, features 1-13

diskette boot control 5-4

Diskette Builder  
operating systems 5-11  
running 5-11

diskette drive  
troubleshooting D-11  
write control, setting 5-4

documentation  
CD 2-3  
hardware 2-6  
reference 2-6  
required for installation 2-6  
software packs 2-6

drivers  
additional information D-10, F-6  
OS installation media F-6  
website F-6

dual inline memory modules *See* DIMMs

**E**

electric shock, warning D-8

electrostatic discharge *See* ESD

equipment damage, warning 2-1

error messages  
additional information C-1  
processor thermal event C-1

ESD (electrostatic discharge)  
damage caused by B-1  
parts, handling B-1  
parts, sorting B-1  
parts, transporting B-1  
precautions B-1

European Union Notice A-6

expansion board, installation 3-23

expansion slots  
bus 3-22  
load balancing 3-22  
number 1-13  
physical location 3-22  
server 1-13  
voltage 3-22

**F**

F9 setup *See* RBSU

factory-installed operating system,  
troubleshooting D-13

fans  
baffle, removing 3-27  
CPU fan connector 4-13  
failure LED E-6, E-7  
I/O fan connector 4-13  
minimum requirements F-5

Fast SCSI-2 device, installing 4-6

FCC  
cable requirements A-4  
Class A devices A-2  
Class A notice A-2  
Class B devices A-3  
Class B notice A-3  
compliance information A-4  
equipment modification A-4  
mouse compliance A-5  
notices A-2  
rules and regulations A-2

features  
server 1-2  
standard hardware 1-4

Federal Communications Commission  
Notice A-2

firmware *See* ROM

firmware, upgrading via ROMPaq 5-9

flash ROM 5-9

front panel components (tower),  
illustrated 1-4

## **G**

grounding  
  methods B-2  
  warning 2-1  
guide screws  
  identifying 3-11  
  installing 3-11  
guidelines  
  cabling 4-1  
  SCSI devices 4-2

## **H**

half-height removable media device,  
  installing 3-15  
hard drive blank, removing 3-13  
hard drives  
  installation 3-13  
  number supported 1-4  
  warranty 1-15  
hardware configuration F-5  
hardware features  
  disk controller 1-13  
  drive dimensions 1-4  
  expansion slots 1-13  
  front panel components 1-4  
  NIC 1-14  
  ports and connectors 1-14  
  processors 1-13  
  rear panel connectors 1-7  
  system board components 1-10  
  system memory 1-13  
hardware installation  
  DIMMs 3-32  
  expansion board 3-23  
  hot-plug hard drive 3-13  
  new, troubleshooting D-13  
  removing access panel (rack) 3-7  
  removing access panel (tower) 3-6  
  tape drive 3-18  
hardware options, installation 3-1

hardware removal  
  bezel 3-5  
  fan baffle 3-27  
hot-plug SCSI, hard drive bay configuration,  
  illustrated 3-12  
HP  
  address A-4  
  telephone numbers A-4  
hyperthreading, enable or disable 5-8

## **I**

IDE cable, description 4-12  
IDE devices to IDE controller,  
  connection 4-12  
identifying, expansion slots 3-22  
indicators *See* LEDs  
Initial Program Loader *See* IPL  
Insight Manager  
  alert 1-15  
  installing 2-31  
  overview 5-11  
  prefailure warning 1-15  
  server features 1-16  
  warranty restrictions 1-15  
installing  
  5.25-inch device 3-15  
  cable management arm bracket 2-16  
  cage nuts 2-18  
  chassis components 2-12  
  component rails 2-14  
  DIMMs 3-32  
  expansion board 3-23  
  guide screws 3-11  
  half-height removable media  
    device 3-15  
  hot-plug hard drive 3-13  
  Insight Manager 2-31  
  internal-to-external SCSI  
    connector 4-10  
  memory modules 3-32  
  operating system 2-32

PPM 3-41  
 processor 3-34  
 redundant power supply 3-50  
 removable media bay device 3-15  
 SCSI hard drives 3-12  
 second processor 3-34  
 server into rack 2-23  
 servers in round-hole racks 2-20  
 SmartStart 2-33, 5-10  
 tape drive 3-18  
 integrated diskette controller 5-4  
 interleaving memory  
   activating 3-29  
   description 3-29  
   guidelines 3-29  
   mode identification 3-29  
 internal SCSI components, illustrated 4-4  
 internal-to-external SCSI connector,  
   installation 4-10  
 interrupt request *See IRQ*  
 IPL (Initial Program Loader), settings 5-4  
 IRQ (interrupt request)  
   APIC 5-7  
   PCI configuration 5-4

**J**

Japanese Notice A-7  
 jumpers, SCSI devices E-13

**K**

key 2-30  
 keyboard, security  
   network server mode 5-6  
   Quicklock 5-6

**L**

laser  
   device regulatory information A-9  
   product label, illustrated A-9

LEDs  
   AC power E-4  
   external health indicator E-4  
   fan failure E-6, E-7  
   front panel 1-12  
   internal health indicator E-4  
   memory E-7  
   NIC indicator E-4  
   overview E-2  
   PCI bus mode E-6, E-7  
   PCI bus speed E-6  
   Power On/Standy E-4  
   power supply E-5  
   PPMs E-5, E-6  
   processors E-6  
   system board E-5  
   temperature threshold E-6  
   troubleshooting D-5  
   unit ID indicator E-4  
 leveling jacks 2-4  
 lifting server, warning 2-23  
 Linux, website information F-6  
 lithium battery *See batteries*  
 LPT Port, settings 5-4

**M**

maintenance and service guide  
   website D-14, F-5  
 Management CD 2-31  
 materials shipped with server 2-11  
 memory  
   adding DIMMs 3-32  
   LEDs E-7  
   minimum requirements F-5  
   NVRAM, resetting 5-7  
   removing DIMMs 3-33  
   warranty 1-15  
 monitor, troubleshooting D-5  
 mounting bracket slide assembly  
   installing 2-19  
   installing in round-hole racks 2-22

mounting brackets, cable management arm,  
installing 2-26  
mouse, FCC compliance A-5  
MPS table mode, settings 5-7

## N

network controller LEDs, summary E-8  
network server mode 5-6  
NIC (network interface controller),  
server 1-14  
NMI debug button 5-7  
NMI, Non-Maskable Interrupt switch  
description E-11  
locating E-11  
Non-Maskable Interrupt switch *See* NMI  
Notices  
Canadian A-5  
Class A equipment A-2  
Class B equipment A-3  
European Union A-6  
Federal Communication  
Commission A-2  
Japanese A-7  
Taiwanese A-7  
NUMLOCK power-on state, setting 5-4  
NVRAM, clearing E-12

## O

opening bezel 3-4  
operating systems  
driver information F-6  
factory installed 2-30  
installation instructions 2-32  
purchased separately 2-32  
selecting 5-3, 5-7  
SmartStart support 5-10  
supported D-10, F-6  
troubleshooting D-13  
upgrading, additional information D-10  
website D-10, F-6

## P

passwords  
administrator 5-5  
power-on 5-5  
setting 5-5  
PCI devices  
interrupt settings 5-4  
IRQ, configuring 5-4  
PME *See* wake support  
port settings 5-4  
ports and connectors, server 1-14  
POST (Power-On Self-Test)  
accessing 5-13  
audible error messages D-8  
error messages, more information D-5  
F1 prompt 5-7  
overview 5-13  
sequence D-4  
speed up 5-7  
power cord  
current rating A-10  
placement A-10  
specifications A-10  
Power On/Standy button, rack  
models 2-29  
Power On/Standy button, summary E-3  
Power On/Standy status, LED E-4  
power supply  
description 1-14  
LED E-5  
power up sequence D-4  
powering down the server 3-3  
powering up the server 2-28  
power-on password  
network server mode 5-6  
Quicklock 5-6  
setting 5-5  
Power-On Self-Test *See* POST  
PPM (Processor Power Module)  
installing 3-41  
LEDs E-5, E-6  
minimum requirements F-5

removal 3-46  
socket location, illustrated 3-35  
preboot execution environment *See* PXE  
preconfigured operating system, installation  
instructions 2-30  
problems, diagnosing *See* troubleshooting  
processor hyperthreading, enable or  
disable 5-8  
processors  
    error message C-1  
    installing 3-34  
    LEDs E-6  
    minimum requirements F-5  
    removing 3-42  
    server 1-13  
    socket location, illustrated 3-35  
    thermal problem C-1  
    troubleshooting D-7  
    warranty 1-15  
PXE (preboot execution environment)  
    enabling 1-14, 5-4  
    server features 1-16

## Q

Quicklock 5-6

## R

rack  
    Compaq branded 2-10  
    cooling requirements 2-3  
    environmental recommendations 2-10  
    installation overview 2-12  
    mounting hardware 2-7  
    ordering requirements 2-3  
    physical specifications 2-3  
    power requirements 2-3  
    resources 2-3  
    site planning 2-3  
    video, Installing Rack Products 2-3  
    warnings 2-4

rack planning resources 2-3  
rack server, specifications F-4  
radio frequency interference,  
    correcting A-3  
rails, component installation 2-14  
RBSU (ROM Based Setup Utility)  
    accessing 5-2  
    Advanced Options menu 5-7  
    ASR menu 5-5  
    BIOS Serial Console menu 5-8  
    Boot Controller Order menu 5-5  
    Date and Time menu 5-5  
    establishing security with 1-17  
    features 1-16  
    IPL Device Boot Order menu 5-4  
    keys 5-2  
    menus, listed 5-3  
    navigation 5-2  
    overview 5-2  
    PCI Devices menu 5-4  
    remote booting, PXE 1-14  
    saving 5-2  
    Server Asset Text menu 5-6  
    server configuration 2-33  
    Server Passwords menu 5-5  
    System Options menu 5-3  
redundant power supply bay,  
    identifying 3-50  
redundant power supply,  
    installation 3-50  
redundant ROM  
    accessing 5-8  
    benefits 5-8  
    defined 5-8  
    switch settings E-13  
registration, server 2-34  
Regulatory Compliance Identification  
    Numbers A-1  
remote boot, PXE 1-14, 5-4  
remote server features 5-11  
removable media bay, installing device  
    into 3-15

removable media device blanks  
    removing 3-9  
    replacing 3-9  
removable media drives, number  
    supported 1-4  
removing  
    access panel (rack) 3-7  
    access panel (tower) 3-6  
    bezel 3-4  
    DIMMs 3-33  
    expansion board retainer,  
        illustrated 3-23  
    memory modules 3-33  
    PPM (Processor Power Module) 3-46  
    removable media device blanks 3-9  
    tape drive 3-20  
replacing  
    access panel (tower) 3-6  
    bezel 3-5  
    lithium battery 3-47  
    removable media device blanks 3-9  
    system board battery 3-47  
resources *See also* documentation  
    CarePaq D-14  
    *HP ProLiant ML350 Generation 3 Server Maintenance and Service Guide* D-14  
    *Servers Troubleshooting Guide* D-14  
ROM  
    flashing 5-9  
    System Firmware Update 5-13  
    updating 3-34  
    upgrading 5-13  
ROM Based Setup Utility *See* RBSU  
ROM Selection, RBSU option 5-7  
ROMPaq  
    diskette, creating 5-10  
    overview 5-9  
    server features 1-16  
round-hole racks, server installation 2-20

**S**

safety standards  
    IEC 825 A-9  
    laser compliance A-9  
sales website 2-9  
screws 2-7  
SCSI  
    ID, setting E-13  
    jumper settings E-13  
SCSI adapter wide-to-narrow,  
    illustrated 4-6  
SCSI adapter, installing 4-6  
SCSI cable, illustrated 4-3  
SCSI cables location, illustrated 4-8  
SCSI device cabling, illustrated 4-7  
SCSI device guidelines 4-2  
SCSI devices  
    additional information 4-4  
    connecting SCSI controller to removable  
        media or other device 4-7  
    connector, identified 4-10  
    Fast SCSI-2, installing 4-6  
SCSI hard drives, installation  
    guidelines 3-12  
security  
    diskette write control 5-4  
    Insight Manager 5-11  
    network server mode 5-6  
    passwords 5-5  
    Quicklock 5-6  
security features 1-17  
serial number, setting 5-4  
server  
    cabling 2-27  
    cabling guidelines 4-1  
    configuration 2-33, 5-1  
    configuration and management  
        tools 1-16  
    data back up 3-3  
    disk controller 1-13

drive bay dimensions 1-4  
drive dimensions 1-4  
expansion slots 1-13  
features 1-2  
front panel components 1-4  
HP series number A-1  
information text, setting 5-6  
installation warning 2-24  
installation, additional items 2-11  
installation, instructions 2-1  
installation, locating materials 2-11  
installation, other options 2-30, 2-32  
installation, overview 2-1  
installation, planning *See* rack  
installing into rack 2-23  
NIC 1-14  
operating system 2-32  
ports and connectors 1-14  
power supply 1-14  
powering down 3-3  
powering up 2-28  
preconfigured operating system 2-30  
processors 1-13  
rear panel connectors 1-7  
registration 2-34  
SCSI devices 4-2  
security features 1-17  
shipping carton contents 2-6  
specifications F-1  
standard hardware features 1-4  
system board components 1-10  
system fan connecting 4-13  
system memory 1-13  
troubleshooting D-1  
utilities 5-1  
video 1-14  
warnings 2-5  
warranty 1-15  
server specifications  
    rack F-4  
    tower F-2  
*Servers Troubleshooting Guide* D-3  
service contact text, setting 5-6  
settings, system configuration switch 2-13  
site environment 2-8  
site planning 2-3  
slide rail assembly  
    described 2-14  
    identifying 2-7  
    removing component rail 2-14  
SmartArray Controller, connecting 4-8  
SmartStart  
    backing up server configuration 2-31  
    Diskette Builder 5-10  
    installing 2-33, 5-10  
    overview 5-10  
    server features 1-16  
    troubleshooting D-11, D-12  
software, troubleshooting, additional information D-10  
specifications  
    overview F-1  
    rack ventilation 2-10  
stabilizers 2-4  
standard hardware, features 1-4  
storage devices 3-10  
supported operating systems D-10  
Survey Utility  
    overview 5-12  
    server features 1-16  
Survey Utility, website 5-12  
switch *See* system configuration switch  
switches, summary E-9  
symbols  
    in text xi  
    on equipment ix  
system board  
    battery, replacing 3-47  
    components, server 1-10  
    LEDs E-5  
system configuration switch  
    clear and reset E-12  
    CMOS, clearing E-12  
    NVRAM, clearing E-12

redundant ROM setting E-13  
setting 2-13, E-9  
System Erase Utility  
  caution D-12  
  running D-12  
system fan, connecting 4-13  
System Firmware Update  
  overview 5-13  
  server features 1-16  
system ID switch, settings E-10  
system memory, server 1-13  
system status LEDs  
  AC power E-4  
  external health status E-4  
  internal health status E-4  
  NIC indicator E-4  
  Power On/Standy E-4  
  redundant power supply failure E-4  
  summary E-3  
  unit ID indicator E-4

**T**

Taiwanese Notice A-7  
tape drive  
  installation 3-18  
  removal 3-20  
technical support xii  
telephone numbers xii, xiii  
  FCC information A-4  
  HP A-4  
temperature threshold LED E-6  
template  
  identifying 2-7  
  using 2-17  
thermal event, processor C-1  
thermal shutdown option 5-5  
tools *See also* utilities  
  for server configuration and  
    management 1-16  
  overview 5-1

torx screws 2-7  
tower server  
  shipping carton contents 2-8  
  specifications F-2  
tower-to-rack option 2-9  
troubleshooting  
  CD-ROM drive D-11  
  CD-ROM, additional information D-11  
  diskette drive D-11  
  factory-installed operating  
    systems D-13  
  hardware, new D-13  
  operating system D-13  
  processor D-7  
  SmartStart D-11, D-12  
  software problems, additional  
    information D-10  
  steps D-3

## **U**

uninterruptible power supply (UPS) *See*  
  UPS  
unpacking the rack server 2-6  
unpacking the tower server 2-8  
UPS  
  protecting server 2-6  
  server environment 2-6  
utilities  
  ACU 5-10  
  Diagnostics 5-12  
  Erase 5-10  
  Insight Manager 5-11  
  overview 5-1  
  POST 5-13  
  RBSU 5-2  
  ROMPaq 5-9  
  server 5-10  
  SmartStart 5-10  
  System Firmware Update 5-13

**V**

ventilation, server requirements 2-10  
video  
    features 1-14  
    Installing Rack Products 2-3

**W**

wake support 5-7  
warnings  
    access panel, removing D-8  
    audible D-8  
    batteries A-8  
    components, reseating D-8  
    electric shock 2-1, D-8  
    equipment damage 2-1  
    fire A-8  
    grounding 2-1  
    hazardous radiation A-9  
    hot surfaces 2-5  
    lifting the server 2-5, 2-23  
    personal injury A-8  
    rack 2-4  
    radiation exposure A-9

server 2-5  
server weight 2-5  
sliding server into rack 2-24  
warranty  
    Insight Manager 1-15  
    server features 1-15  
    website 1-15, D-14  
wattage, power supply 1-14  
websites  
    CarePaq D-14  
    Diagnostics Utility 5-12  
    drivers F-6  
    HP xiii, F-5  
    HP sales 2-9  
    Linux information F-6  
    maintenance and service guide D-14, F-5  
    operating systems D-10, F-6  
    service and support upgrades D-14  
    Survey Utility 5-12  
    updating ROM 3-34  
    warranty 1-15, D-14  
wrist strap, using B-2